US009315289B2

(12) **United States Patent**
Nakamura et al.

(10) **Patent No.: US 9,315,289 B2**
(45) **Date of Patent: Apr. 19, 2016**

(54) **PACKAGING MEMBER AND PACKAGING METHOD**

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(73) Assignee: **RICOH COMPANY, LTD.**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 817 days.

(21) Appl. No.: **13/313,155**

(22) Filed: **Dec. 7, 2011**

(65) **Prior Publication Data**

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(30) **Foreign Application Priority Data**

Dec. 9, 2010 (JP) 2010-274396

(51) **Int. Cl.**
B65D 5/50 (2006.01)

(52) **U.S. Cl.**
CPC ***B65D 5/5004*** (2013.01); ***B65D 5/505*** (2013.01); ***B65D 5/5054*** (2013.01); *B65D 2585/689* (2013.01); *G03G 2215/0875* (2013.01); *G03G 2215/0886* (2013.01)

(58) **Field of Classification Search**
CPC B65D 2571/0066; B65D 5/48036; B65D 5/5016; B65D 5/48034; B65D 81/058; B65D 5/5004; B65D 5/505; B65D 5/5054; B65D 2585/698; B65D 81/02; B65D 81/05; B65D 81/053; B65D 51/057; B65B 81/02; B65B 81/05; B65B 81/057; G03G 2215/0886; G03G 2215/0875
USPC 53/461, 474, 462, 473; 229/120.02, 229/103.2, 103.3, 122.24, 122.26, 122.29, 229/183, 184, 185.1, 186, 191, 192; 206/521, 583, 586, 593, 521.2–521.9
See application file for complete search history.

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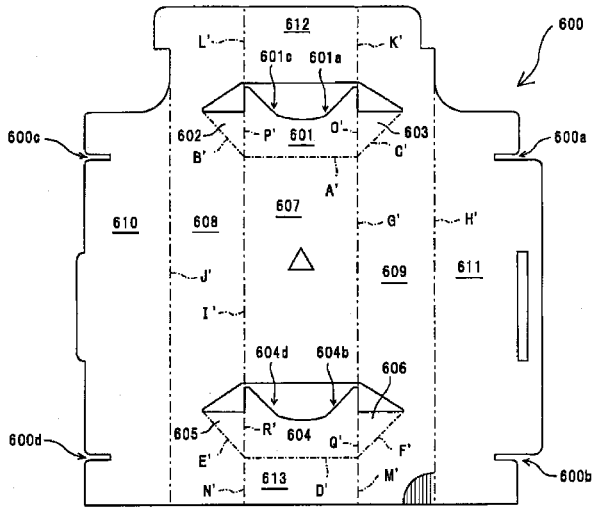
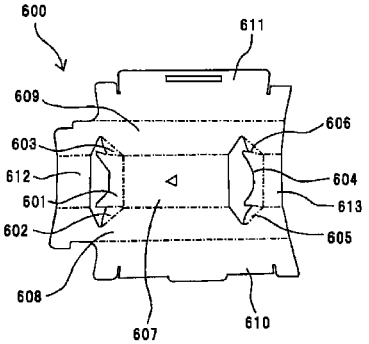
Primary Examiner — Stephen F Gerrity
(74) *Attorney, Agent, or Firm* — Cooper & Dunham LLP

(57) **ABSTRACT**

A packaging member includes a cushioning member that holds a holding part of a to-be-packaged member different from a predetermined part of the to-be-packaged member without coming into contact with the predetermined part of the to-be-packaged member. The cushioning member cushions a shock transmitting to the to-be-packaged member, and the packaging member packages the to-be-packaged member via the cushioning member.

6 Claims, 56 Drawing Sheets





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JP	2004-287404	10/2004
JP	2007-261646	10/2007
JP	2010-70190	4/2010

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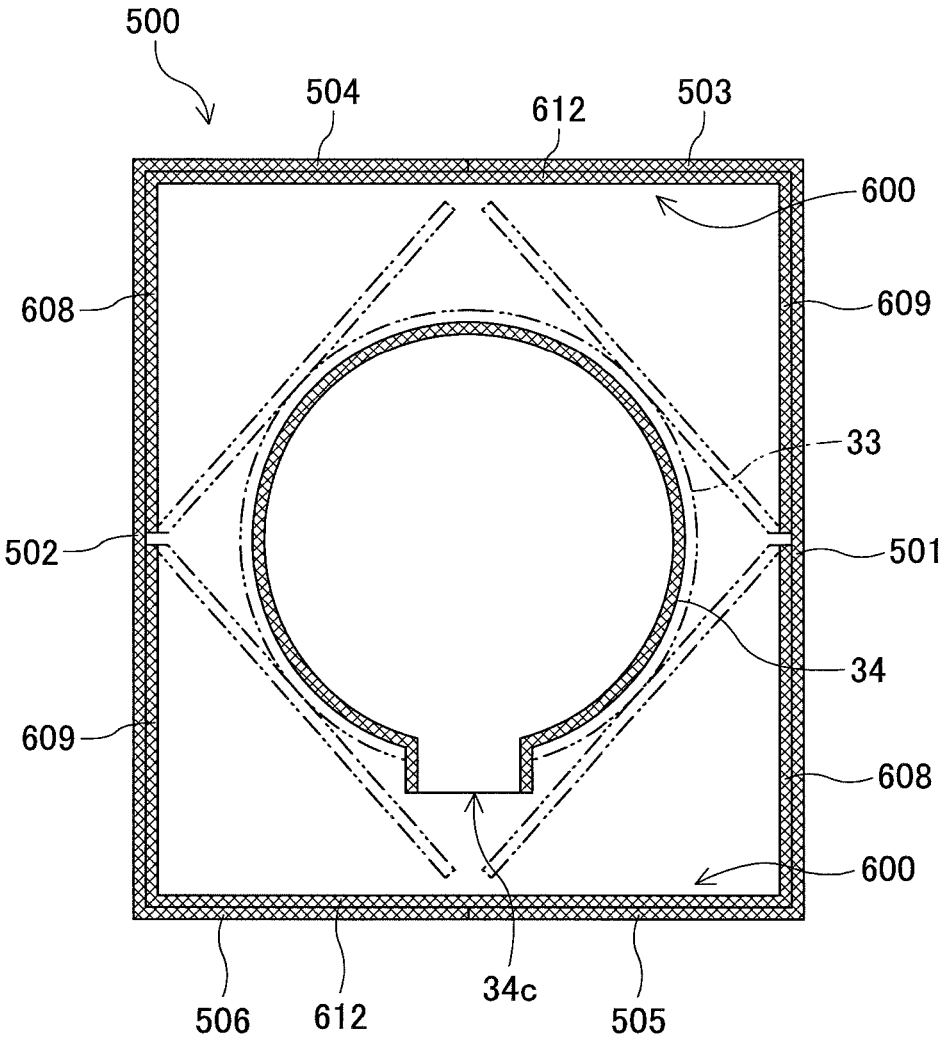
FIG.1A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609
608
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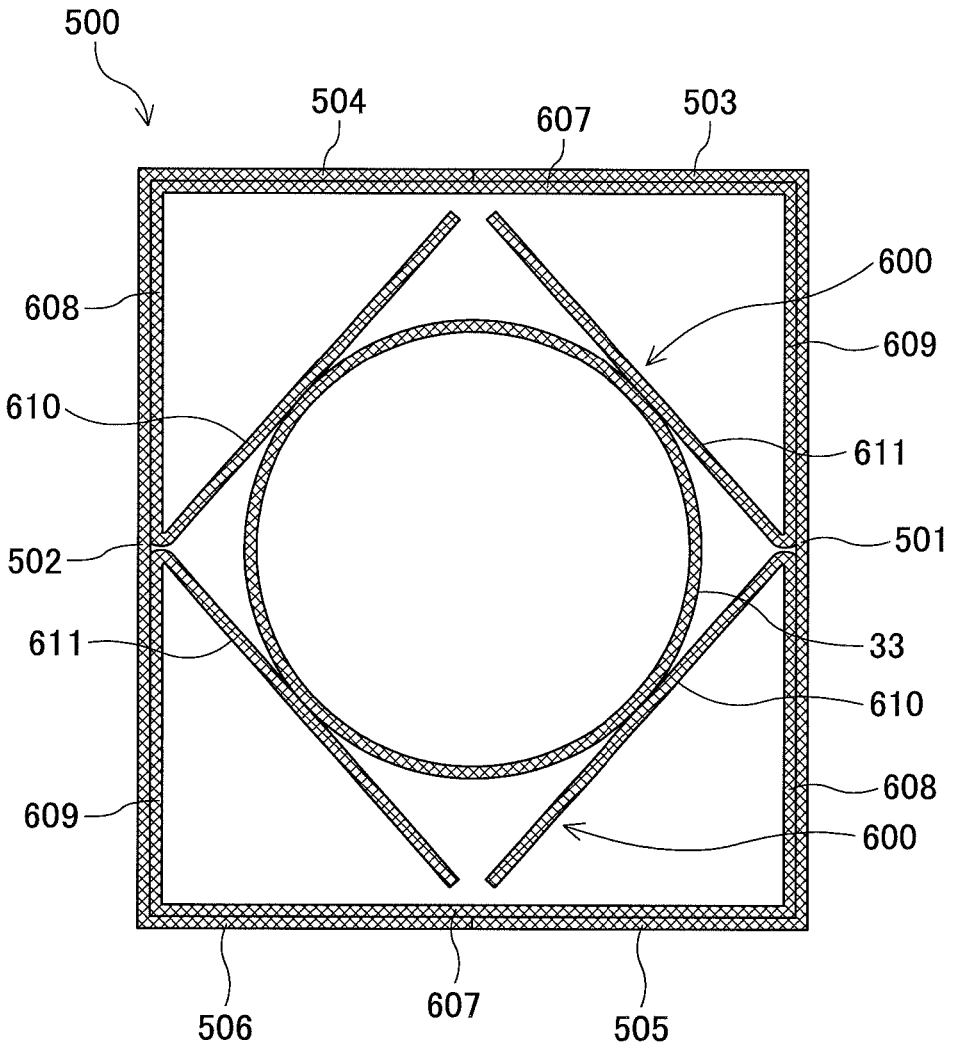
506
612
34c
505

FIG.1B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506
607
505

FIG.2

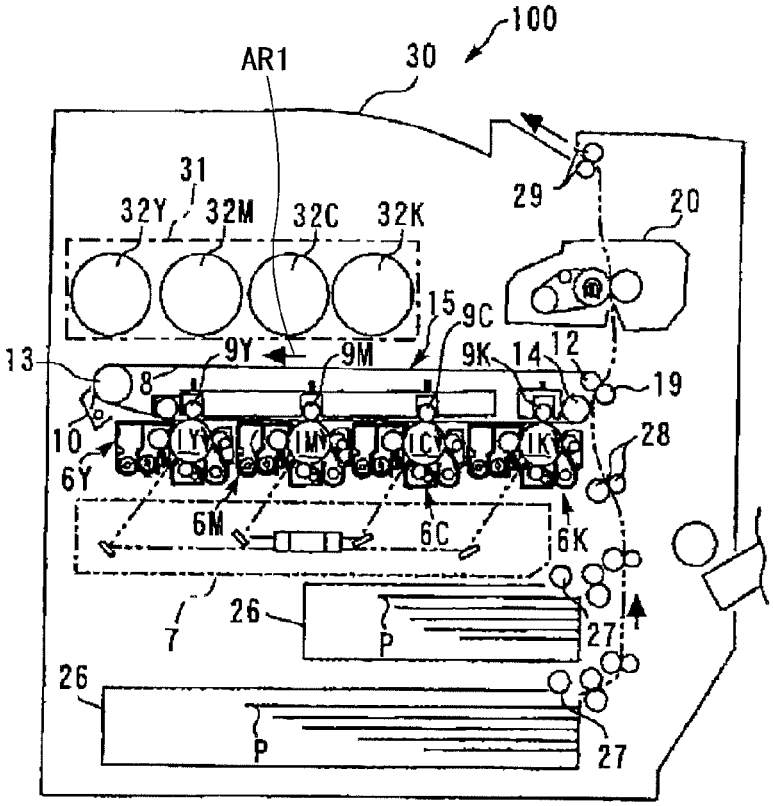

100
AR1
30
31
32Y
32M
32C
32K
29
20
15
9C
13
9Y
9M
9K
14
12
19
8
10
6Y
1Y
1M
1C
1K
28
6M
6C
6K
7
26
P
27

FIG.3

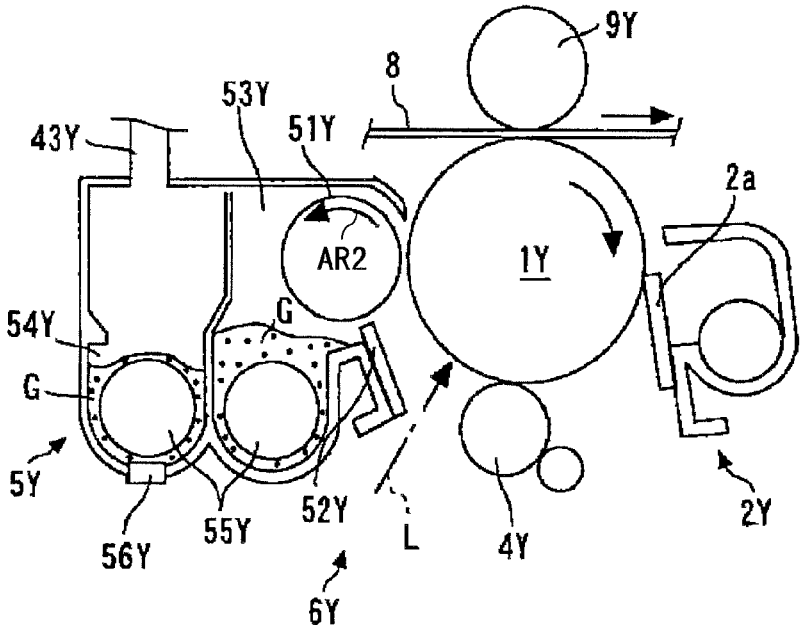

9Y
8
53Y
43Y
51Y
2a
AR2
1Y
54Y
G
5Y
56Y
55Y
52Y
L
4Y
2Y
6Y

FIG.4

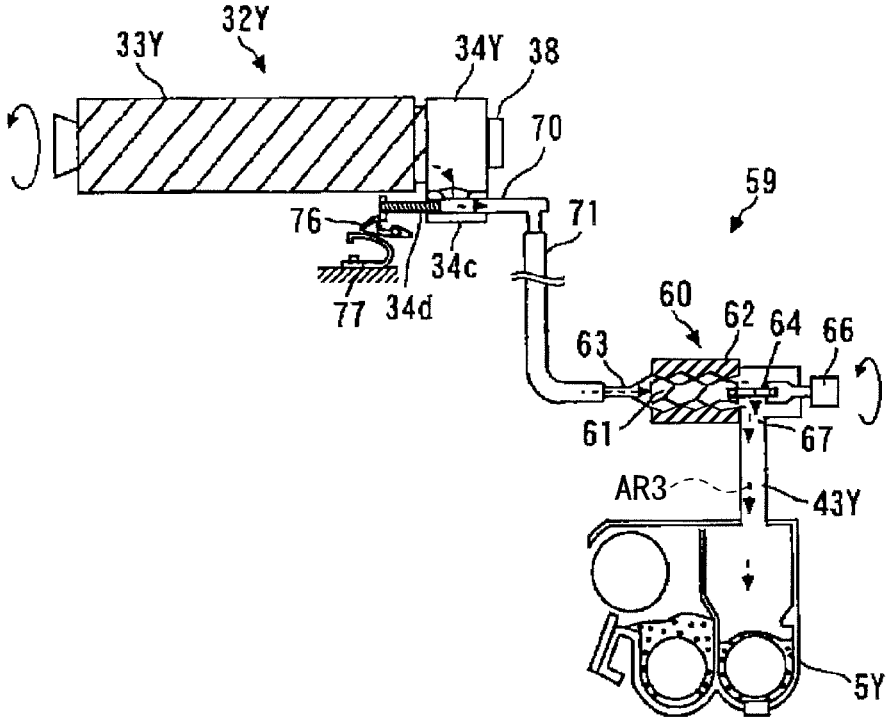

32Y
33Y
34Y
38
70
59
76
71
34c
77
34d
60
62
64
66
63
61
67
AR3
43Y
5Y

FIG.5

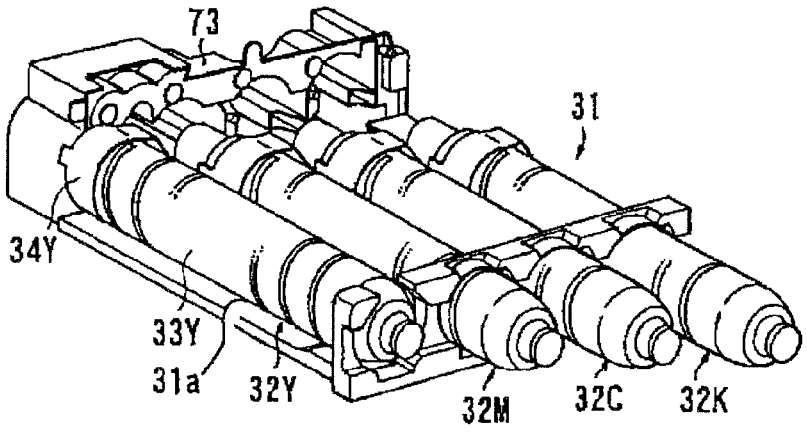

73
31
34Y
33Y
31a
32Y
32M
32C
32K

FIG.6

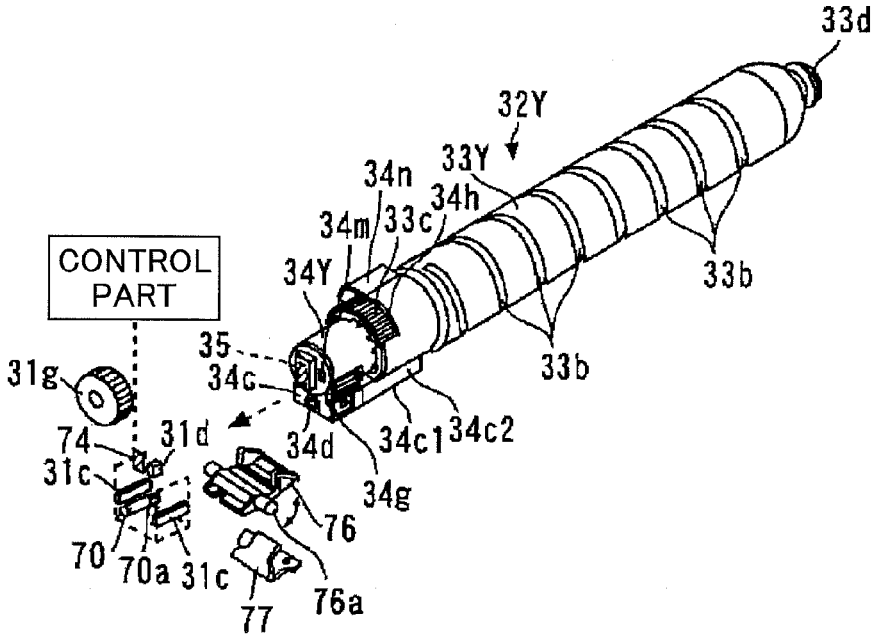

33d
32Y
33Y
34n
34h
34m
33c
34Y
33b
CONTROL PART
35
34c
31g
74
31d
34d
34c1
34c2
31c
34g
76
70
70a
31c
77
76a

FIG.7

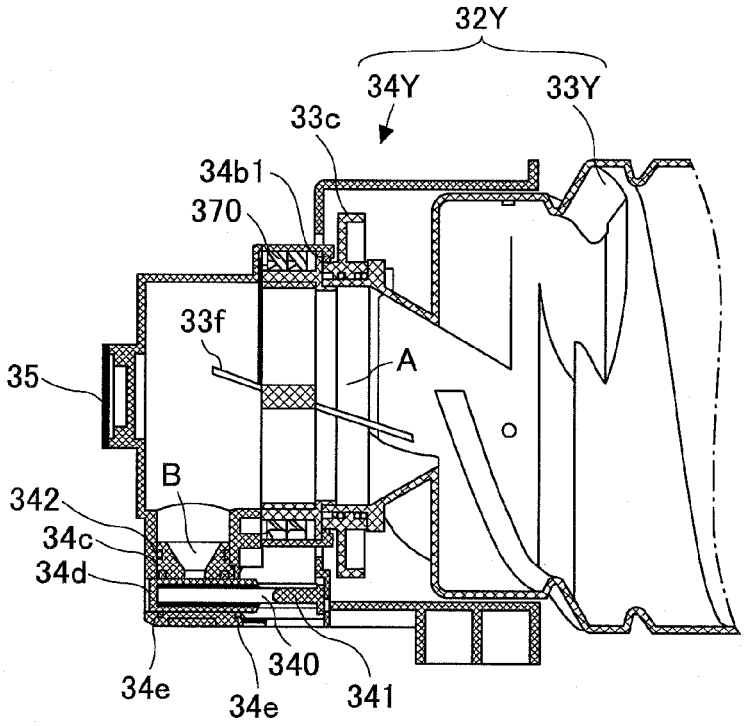

32Y
34Y
33Y
33c
34b1
370
33f
A
35
B
342
34c
34d
34e
340
341
34e

FIG.8

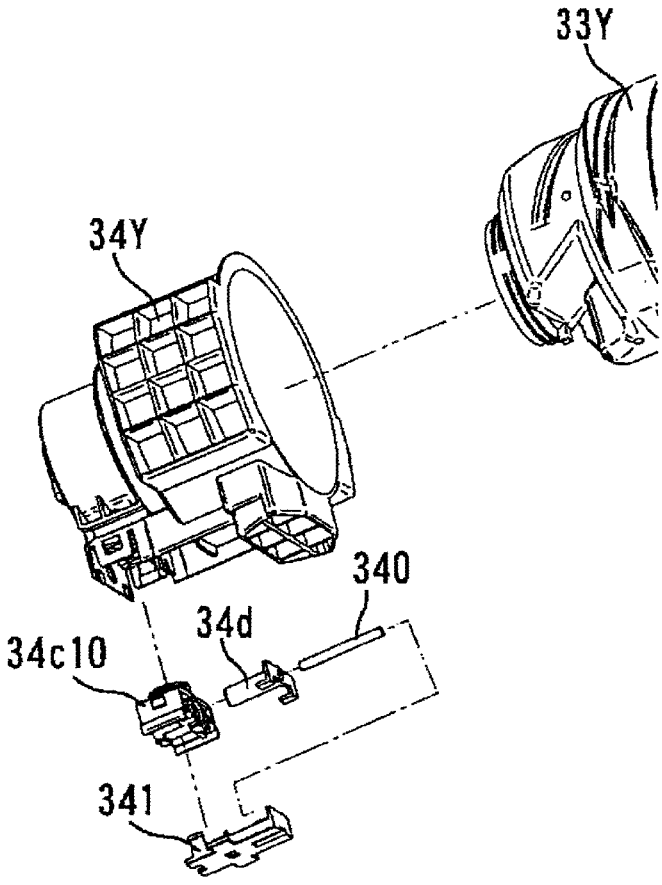


FIG.9

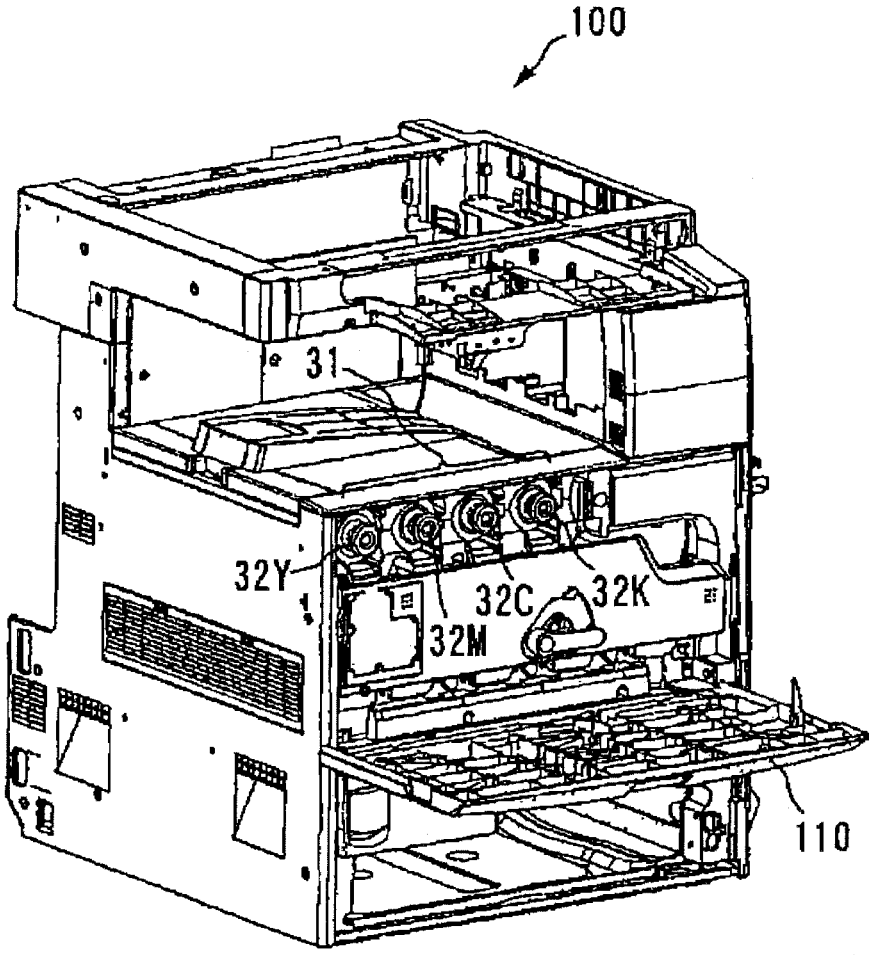
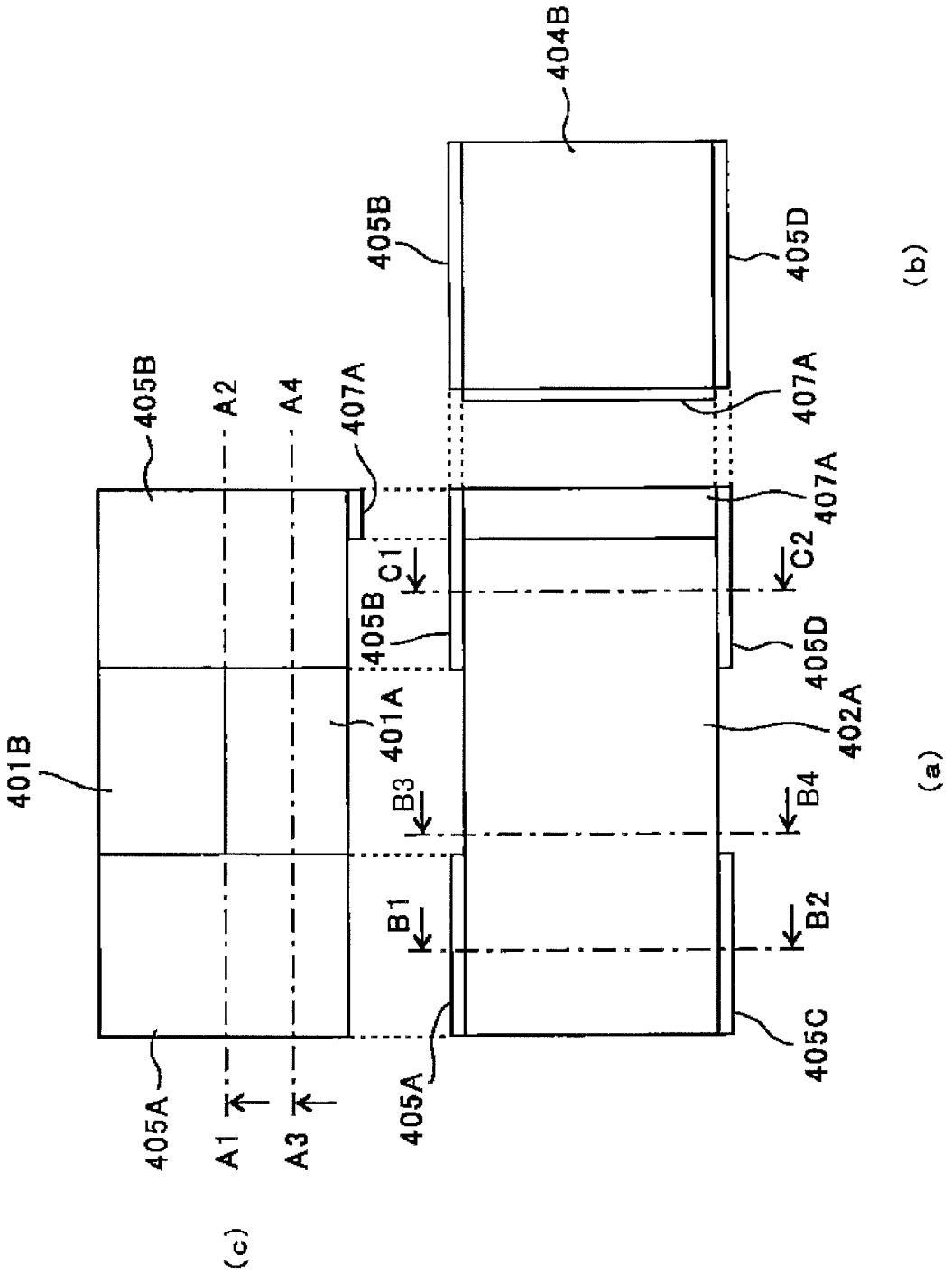


FIG.10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405B
405D
407A
407A
405B
407A
A2
A4
C1
C2
405B
405D
401A
402A
401B
B3
B4
B1
B2
405C
405A
A1
A3
405A
(c)
(a)
(b)

FIG.11

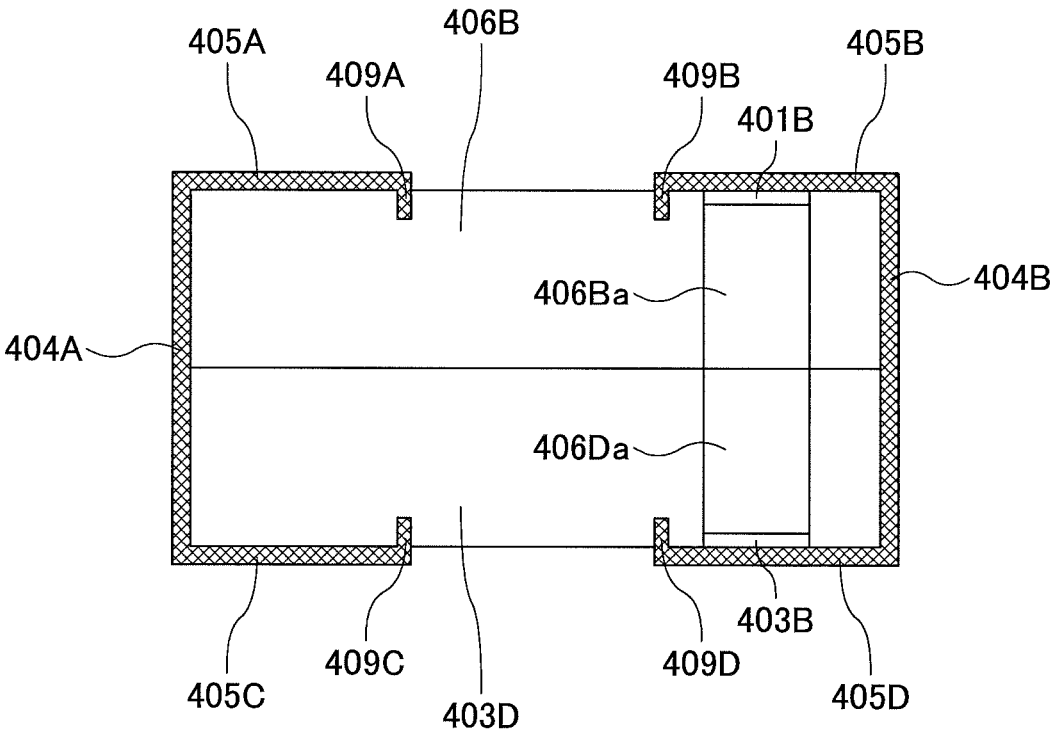

405A
406B
409A
409B
405B
401B
404B
406Ba
404A
406Da
403B
405C
409C
403D
409D
405D

FIG.12

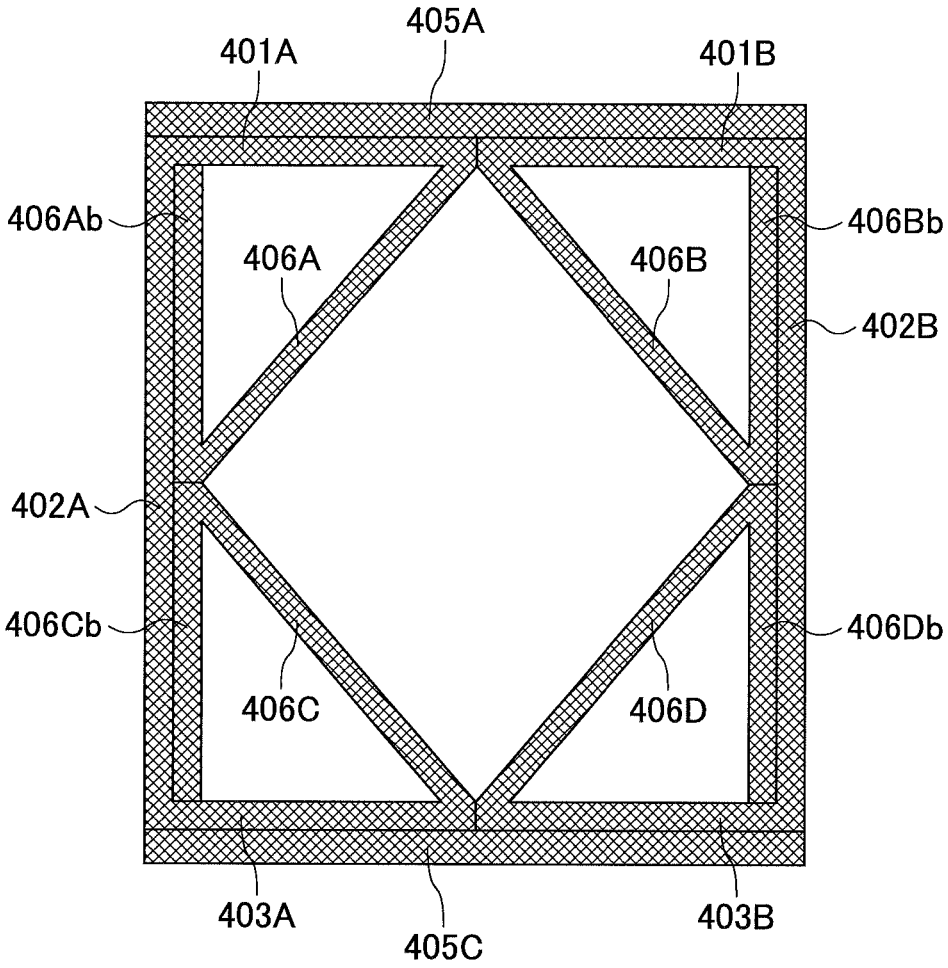

405A
401A
401B
406Ab
406Bb
406A
406B
402B
402A
406Cb
406Db
406C
406D
403A
405C
403B

FIG.13

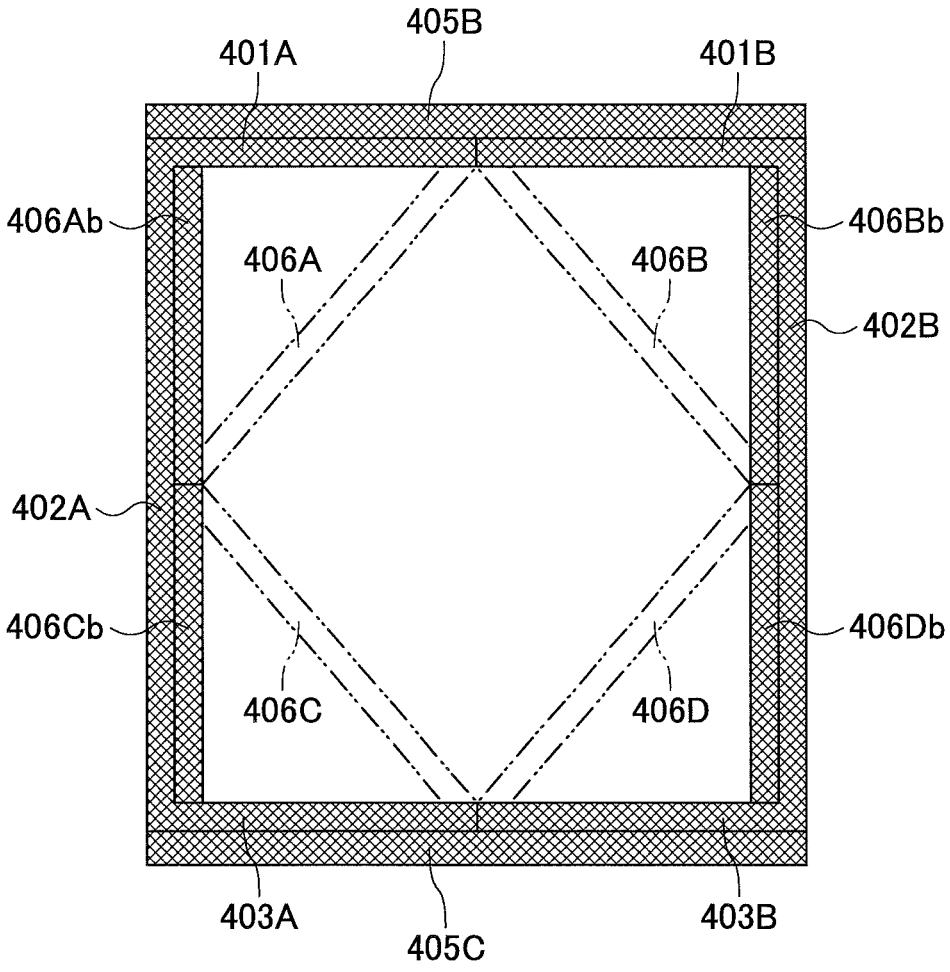
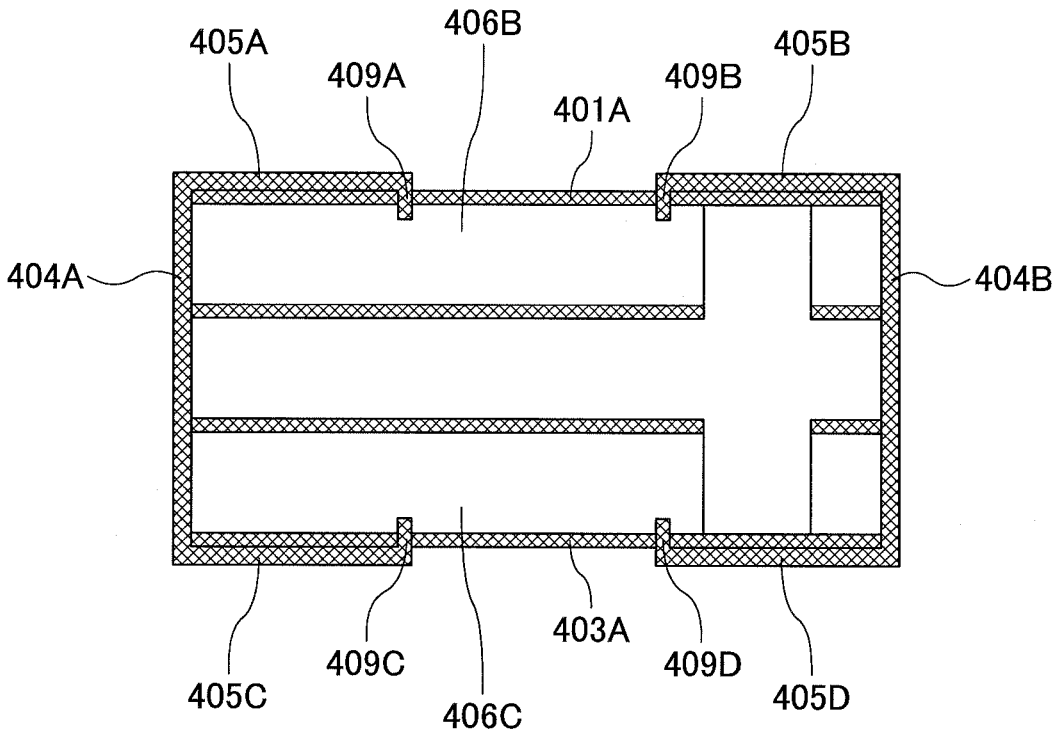

405B
401A
401B
406Ab
406Bb
406A
406B
402B
402A
406Cb
406Db
406C
406D
403A
405C
403B

FIG.14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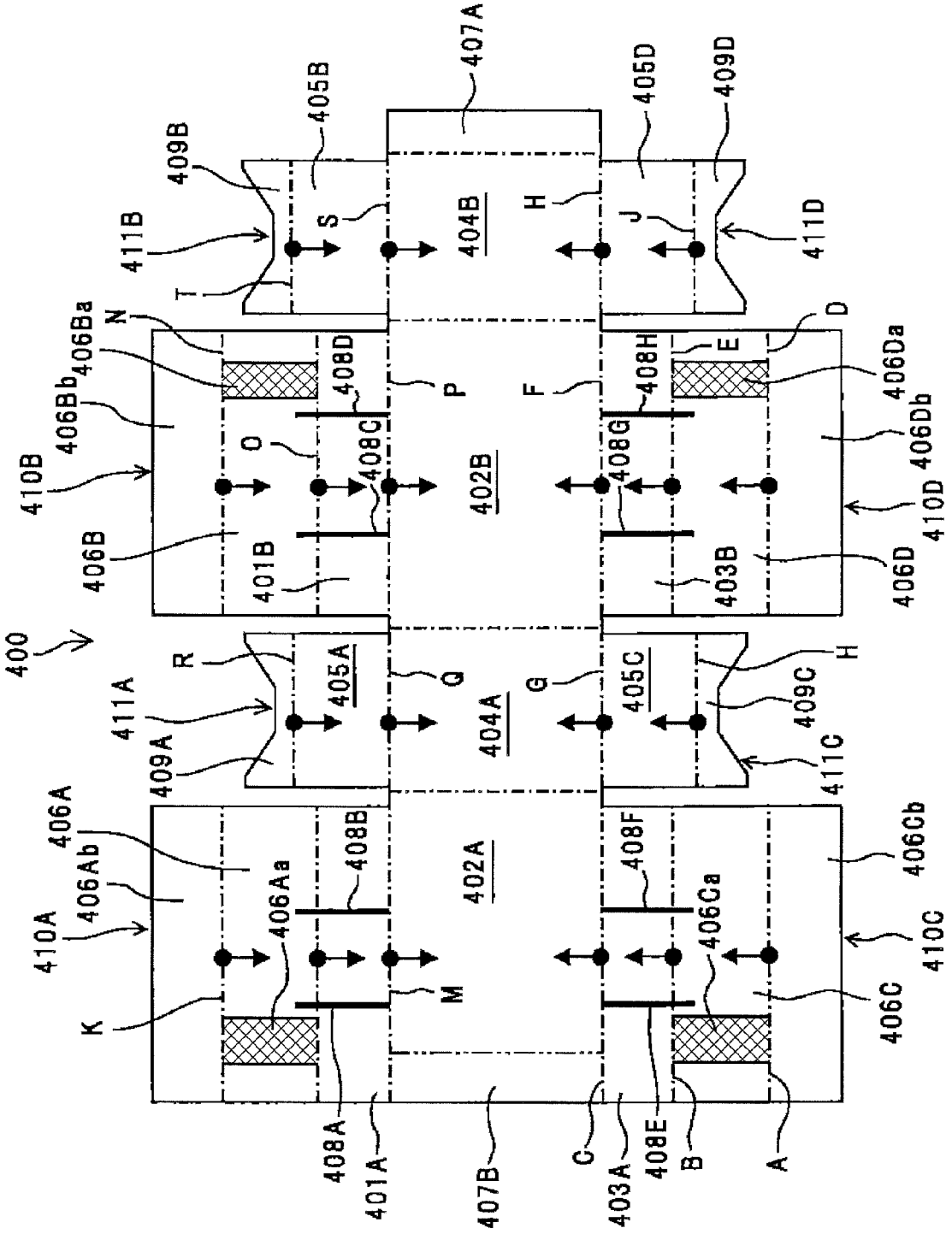
406B
409A
405B
409B
401A
404A
404B
405C
409C
406C
403A
409D
405D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410A
410B
410C
410D
411A
411B
411C
411D
401A
401B
402A
402B
403A
403B
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404B
405A
405B
405C
405D
406A
406Aa
406Ab
406B
406Ba
406Bb
406C
406Ca
406Cb
406D
406Da
406Db
407A
407B
408A
408B
408C
408D
408E
408F
408G
408H
409A
409B
409C
409D
A
B
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D
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K
M
N
O
P
Q
R
S
T

FIG.15

FIG.16

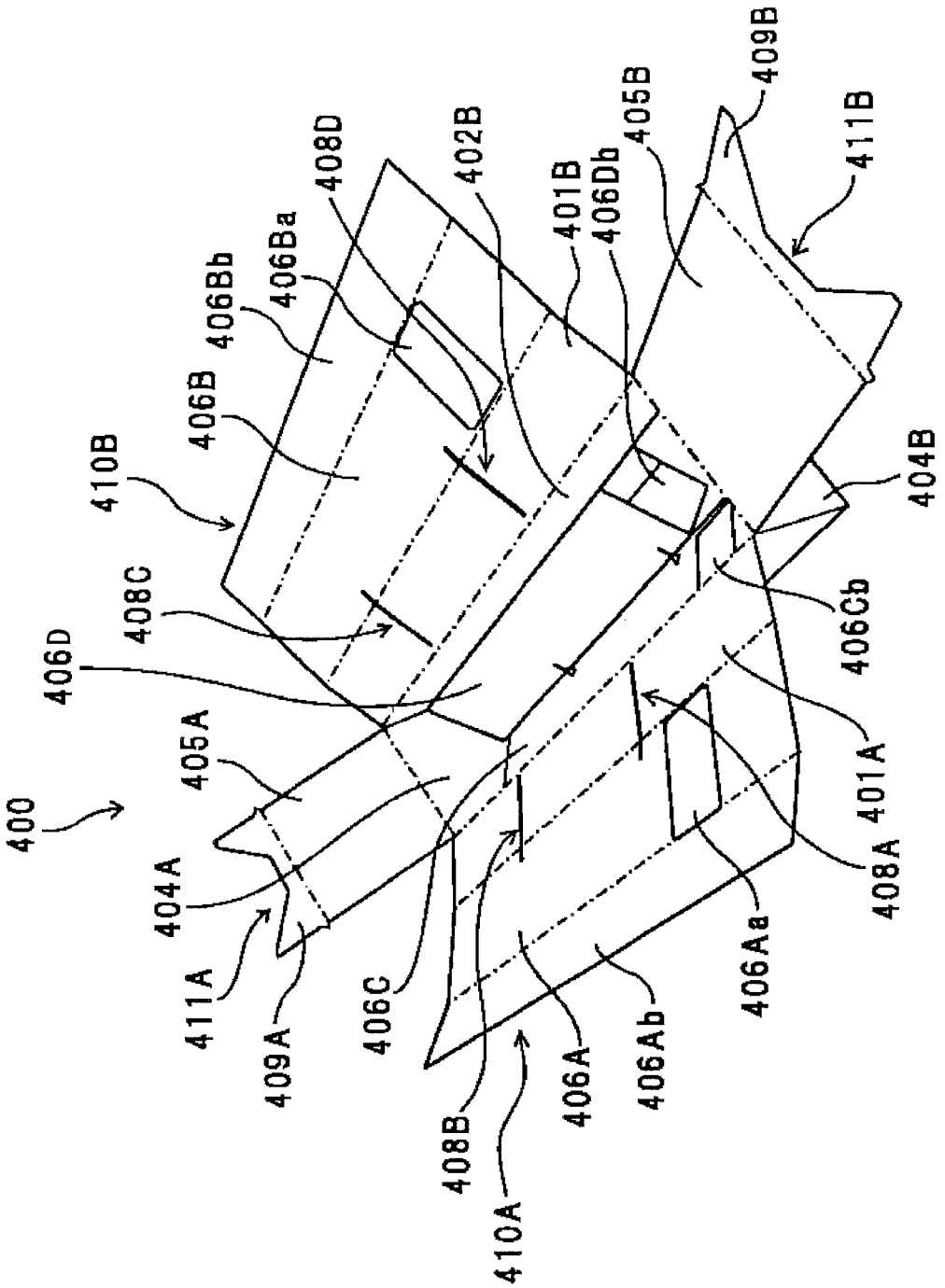

400
410B
406B
406Bb
406Ba
408D
402B
401B
406Db
405B
409B
411B
404B
406Cb
406D
408C
405A
404A
411A
409A
406C
408B
410A
406A
406Ab
406Aa
408A
401A

FIG.17

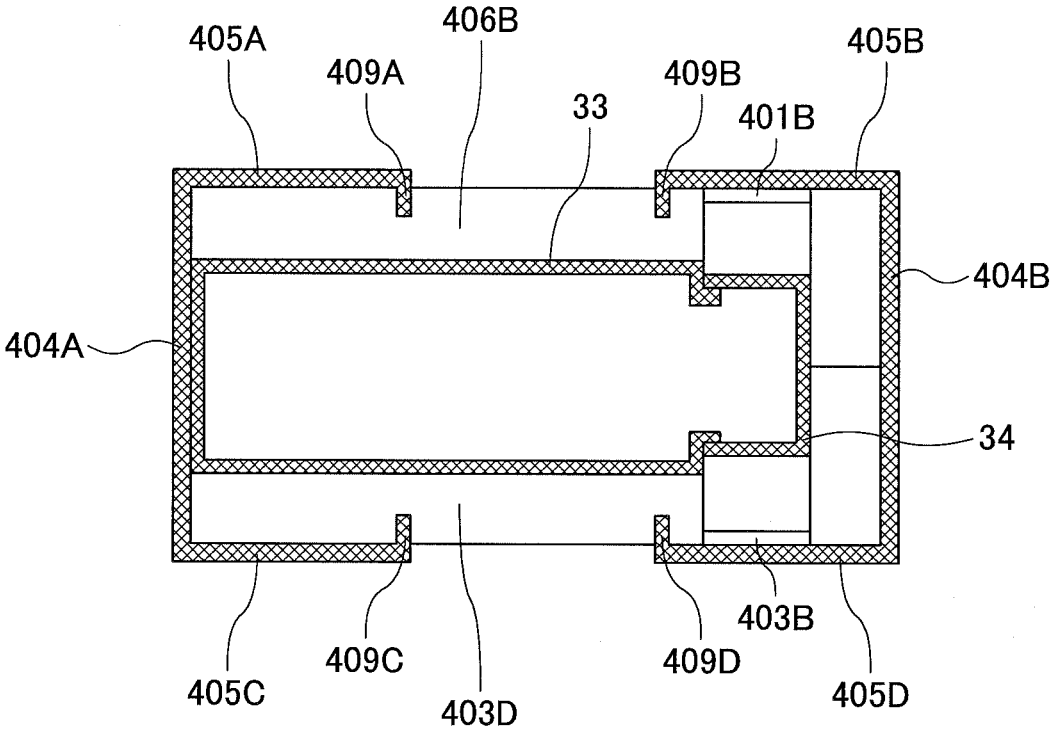

405A
406B
409A
33
409B
401B
405B
404B
404A
34
403B
405C
409C
403D
409D
405D

FIG.18

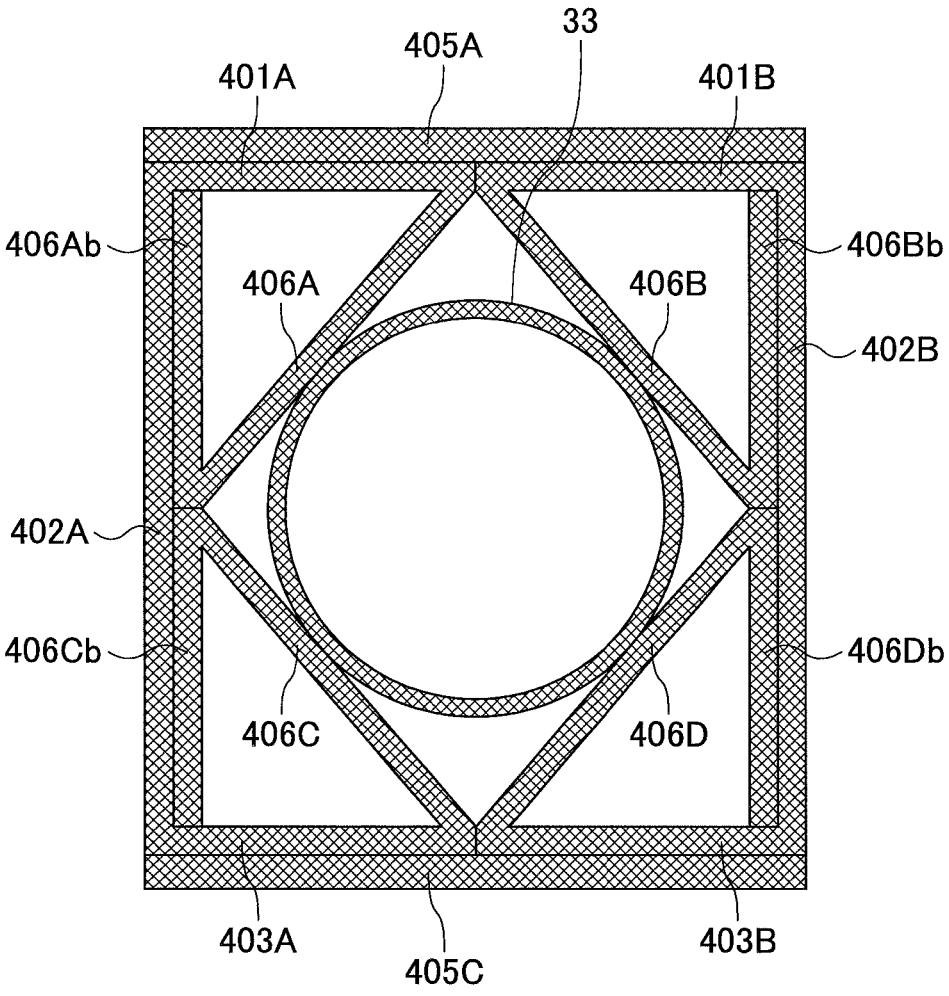
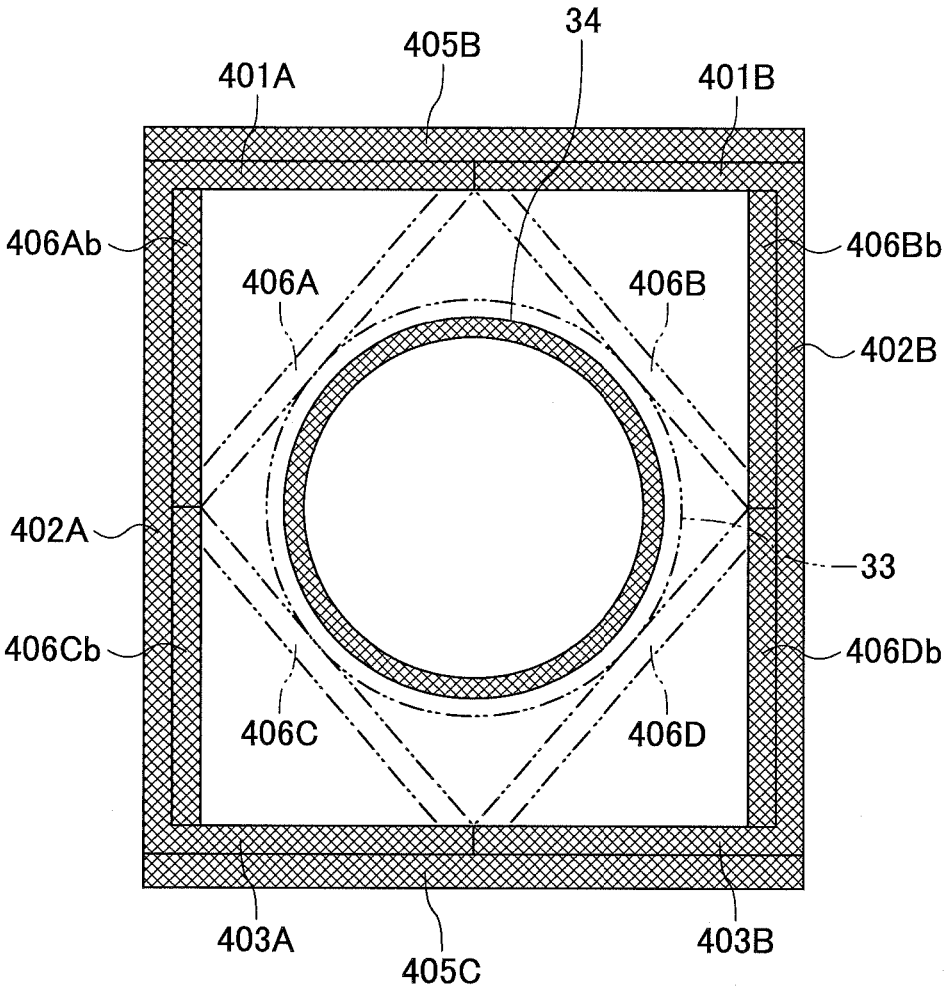

33
405A
401A
401B
406Ab
406Bb
406A
406B
402B
402A
406Cb
406Db
406C
406D
403A
405C
403B

FIG.19


34
405B
401A
401B
406Ab
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406A
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33
406Cb
406Db
406C
406D
403A
405C
403B

FIG.20

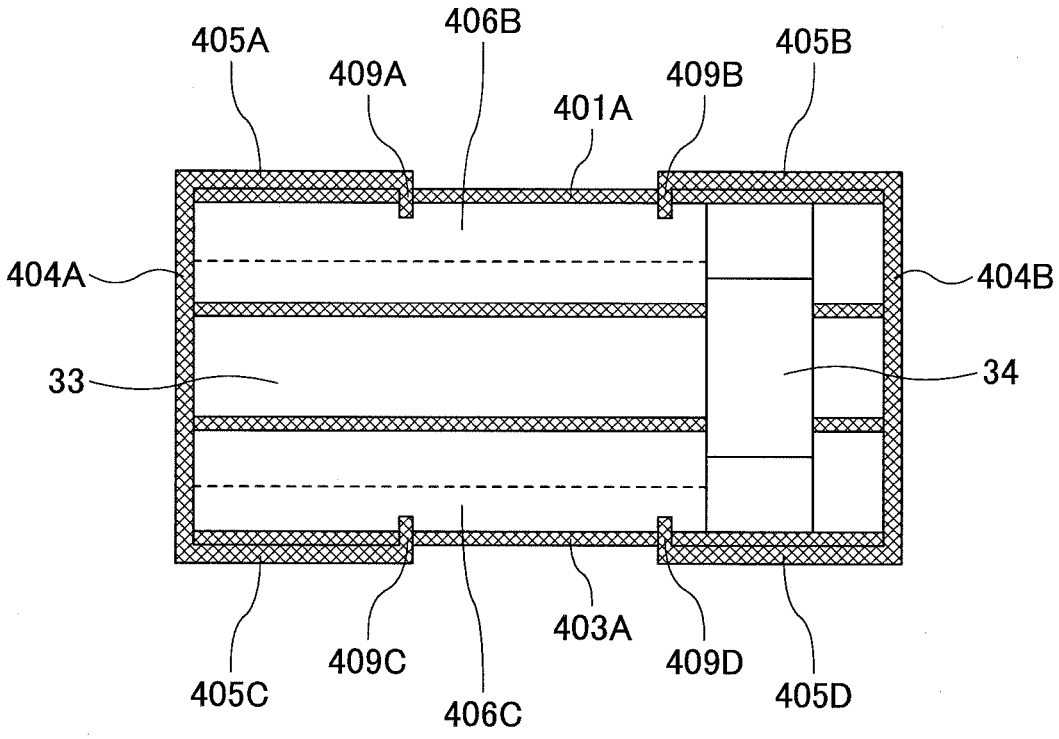
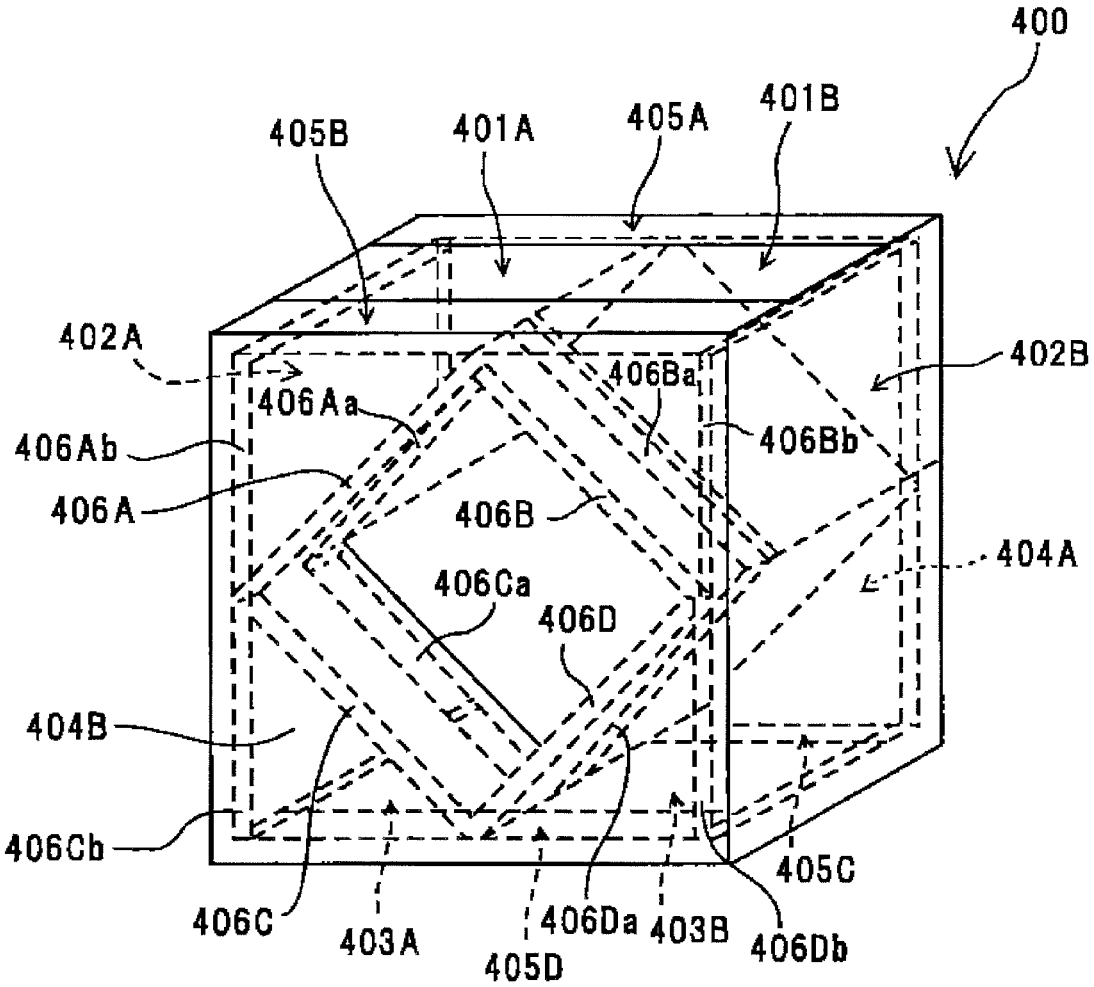

405A
406B
409A
401A
409B
405B
404A
404B
33
34
403A
405C
409C
406C
409D
405D

FIG.21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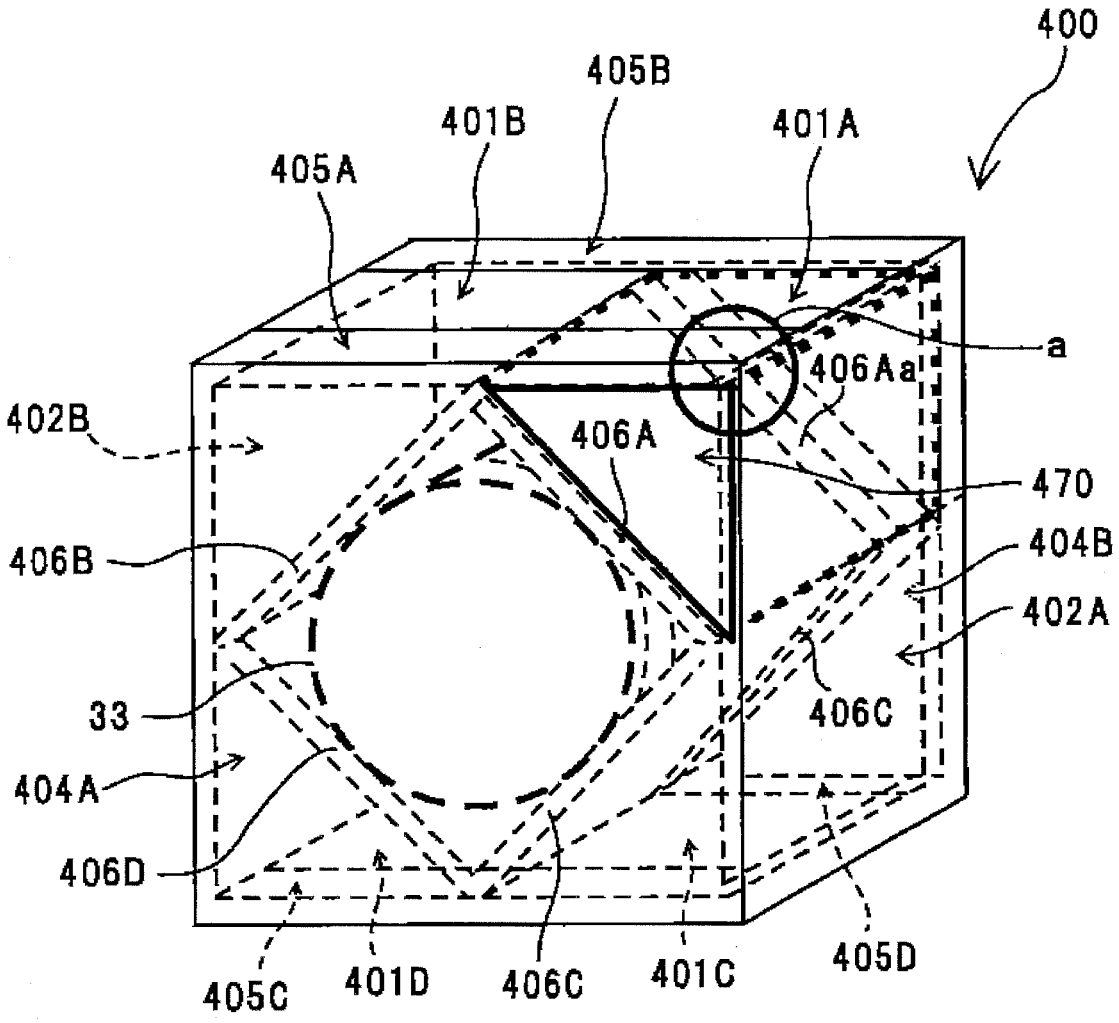
405B
401A
405A
401B
402A
406Aa
406Ab
406A
406Ba
406Bb
406B
402B
404A
406Ca
406D
404B
406Cb
406C
403A
405D
406Da
403B
406Db
405C

FIG.22


400
405B
401B
401A
405A
a
406Aa
402B
406A
470
406B
404B
402A
33
406C
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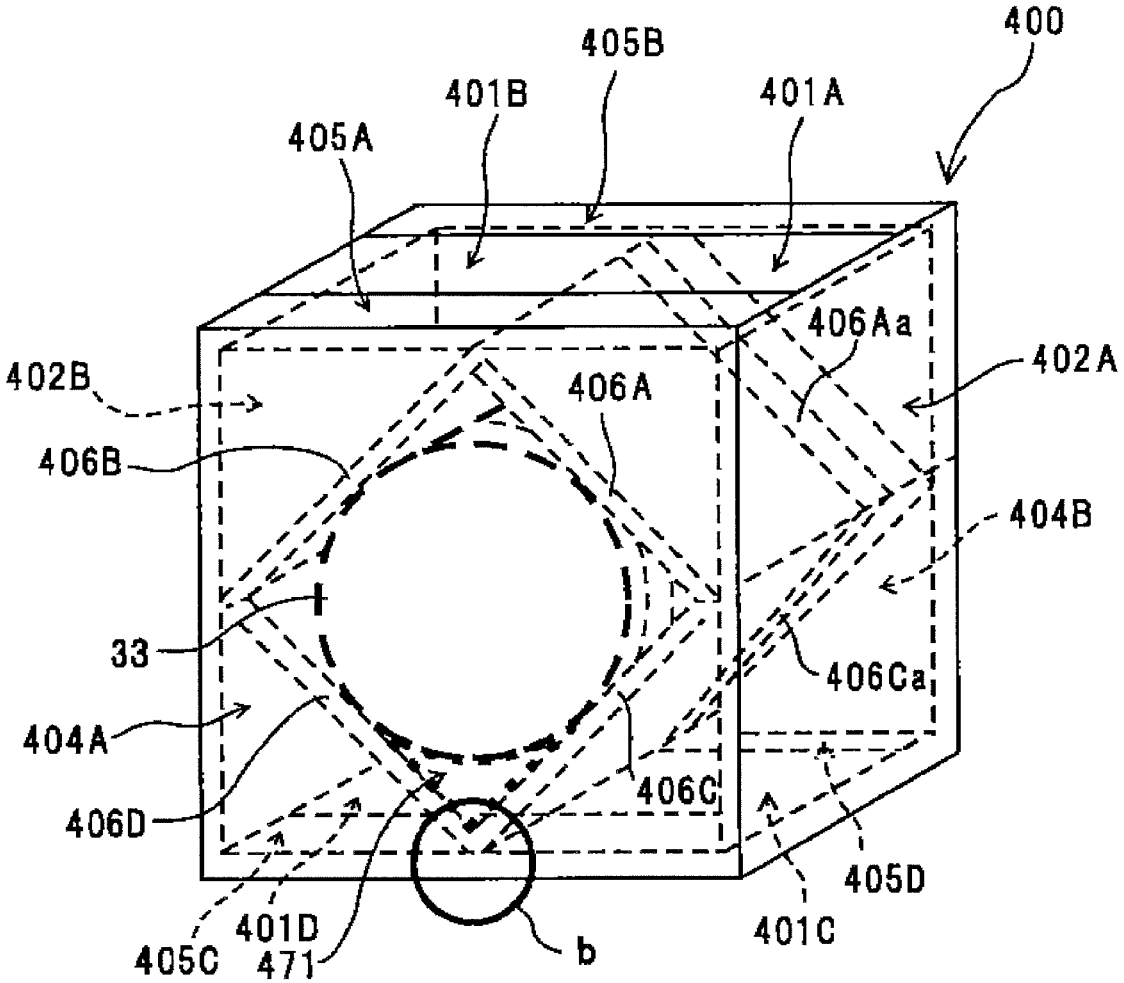
406D
405C
401D
406C
401C
405D

FIG.23


400
405B
401B
401A
405A
406Aa
402A
402B
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404B
33
406Ca
404A
406C
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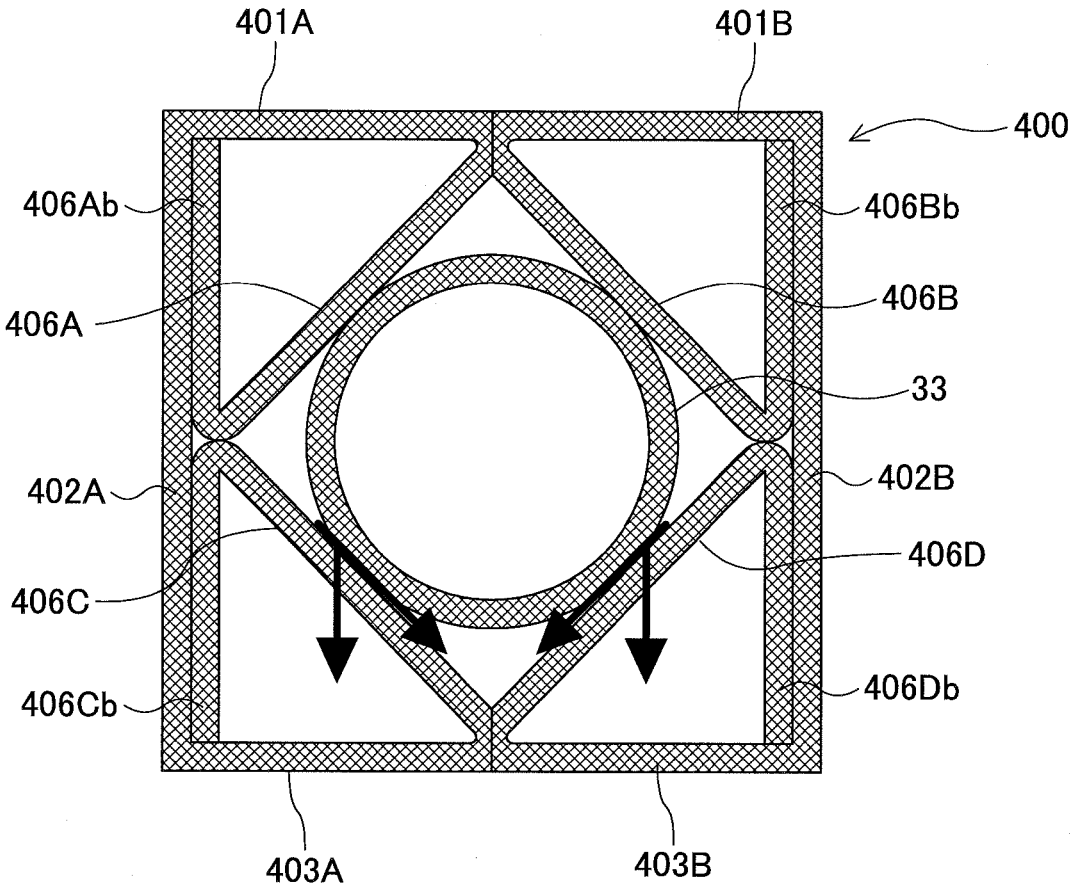
405D
401D
405C
471
401C
b

FIG.24


401A
401B
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406Cb
406Db
403A
403B

FIG.25

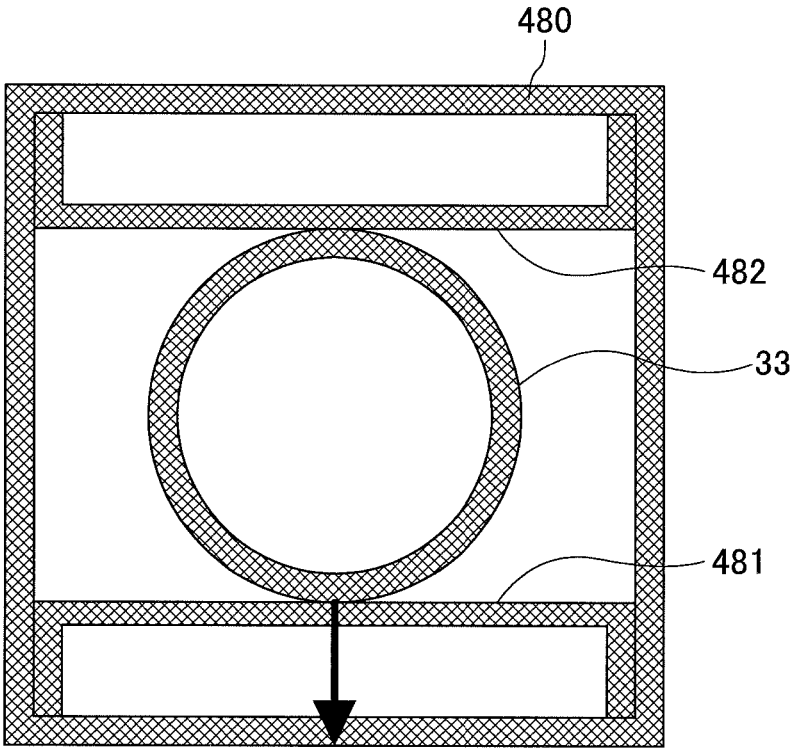


FIG.26

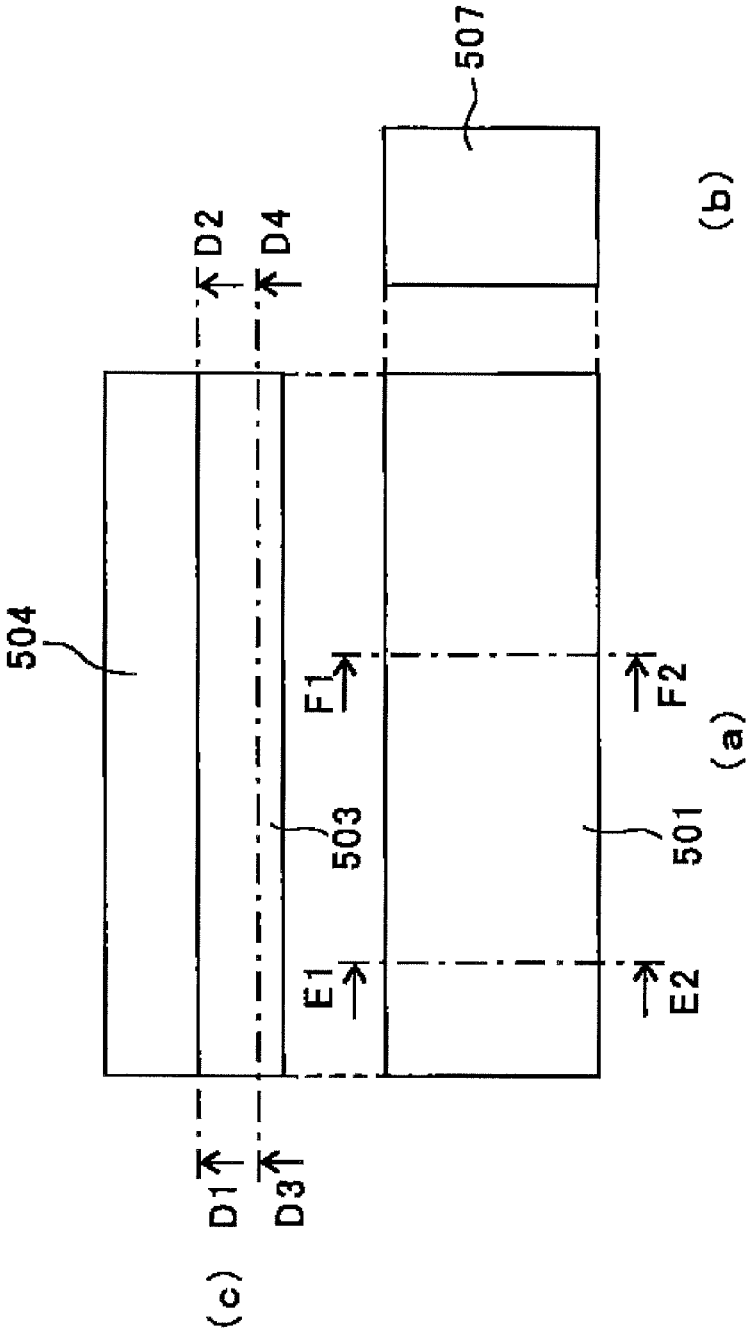
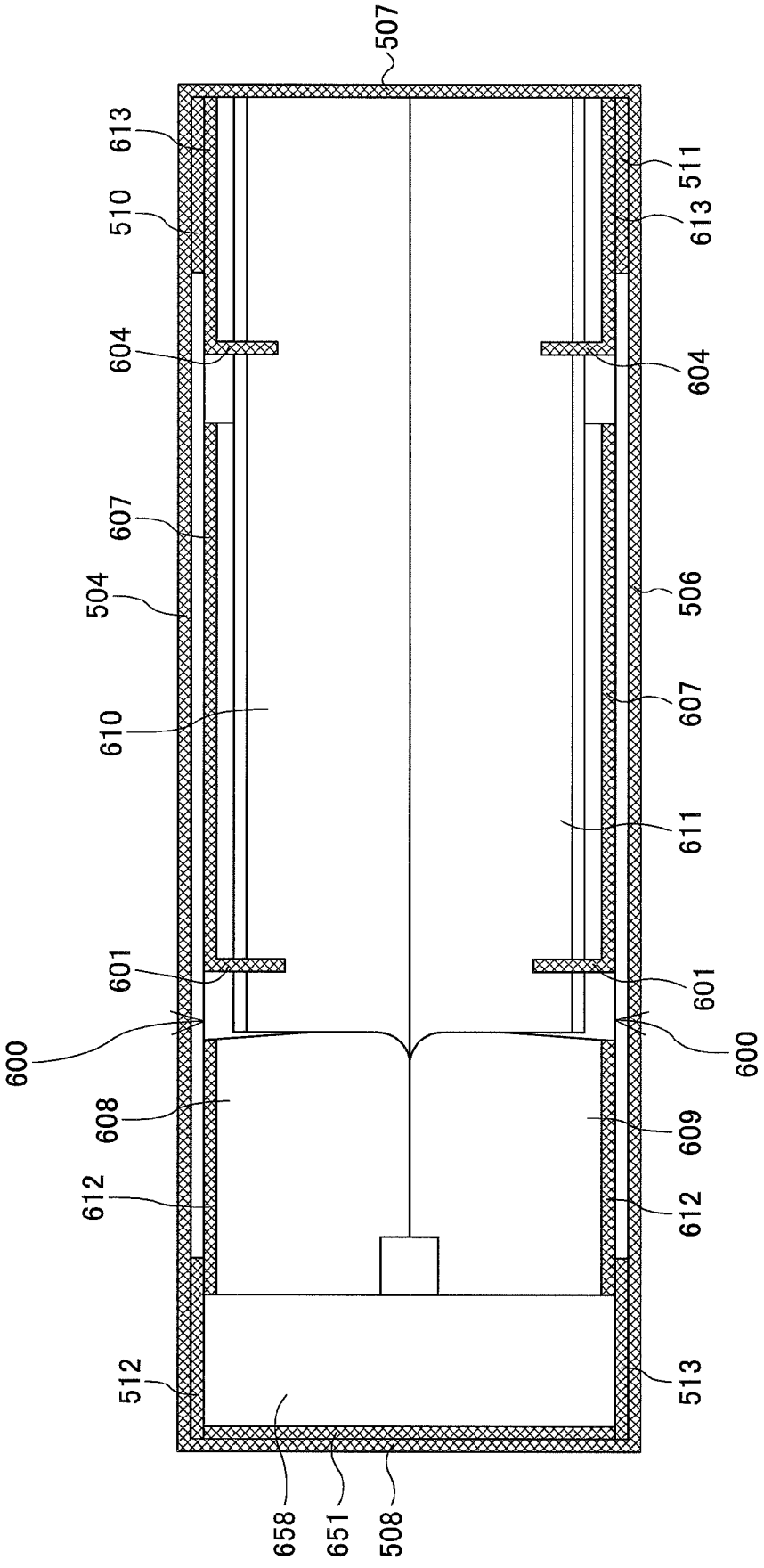


FIG.27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612
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FIG.28

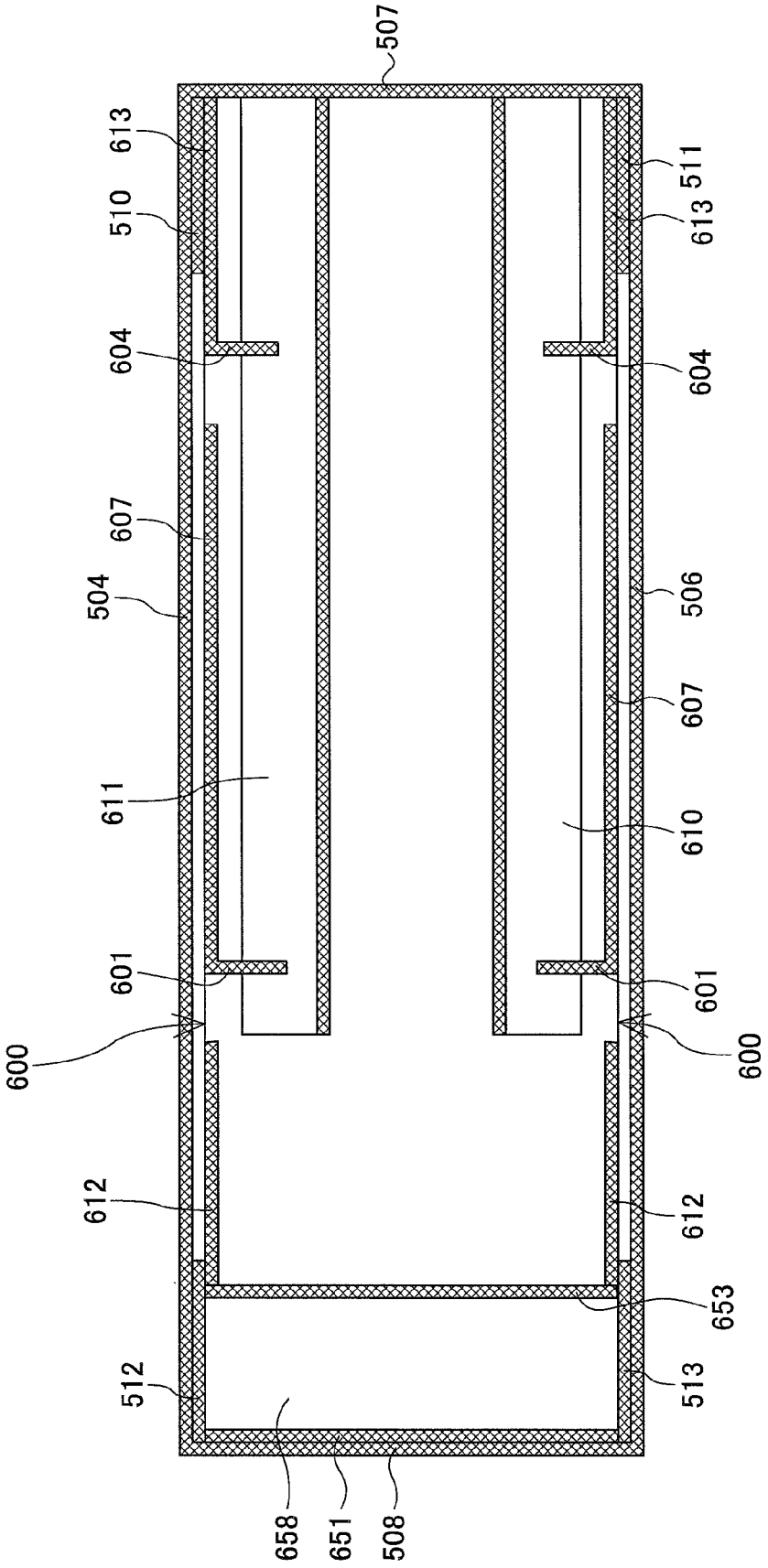
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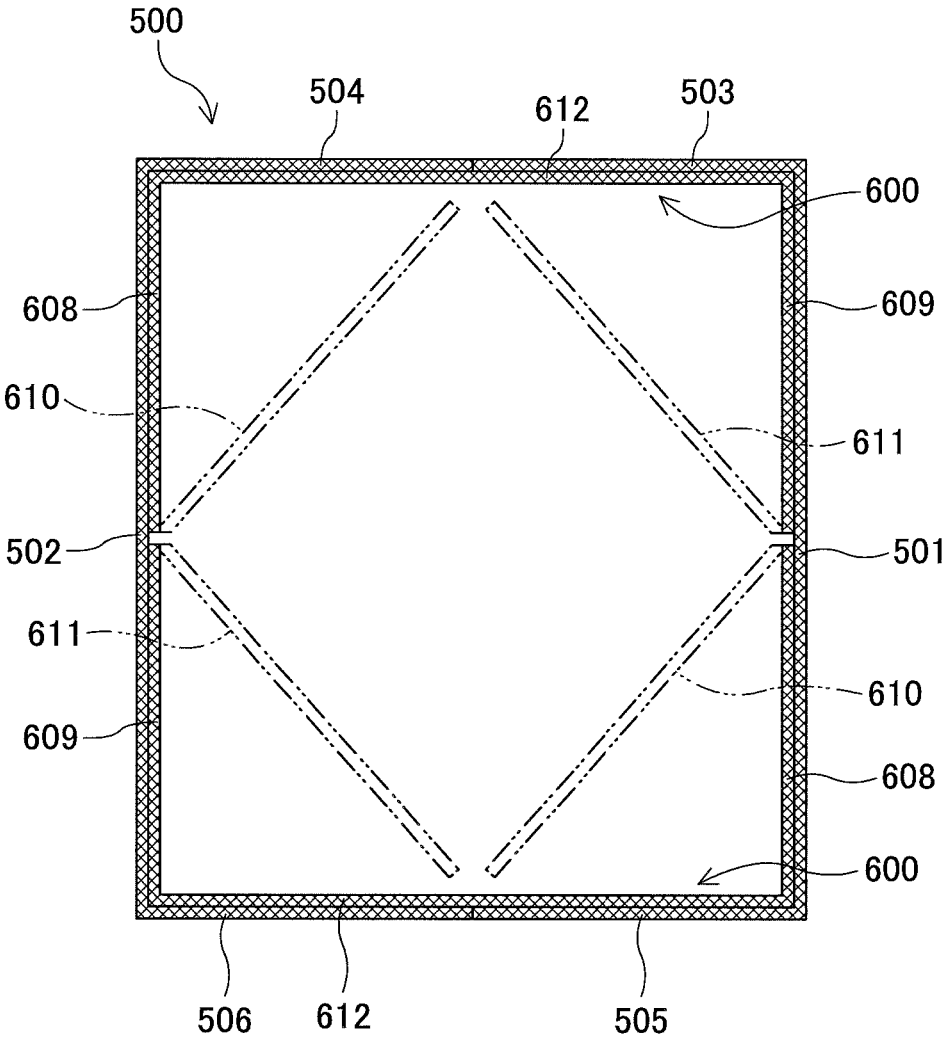
FIG.29A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505

FIG.29B

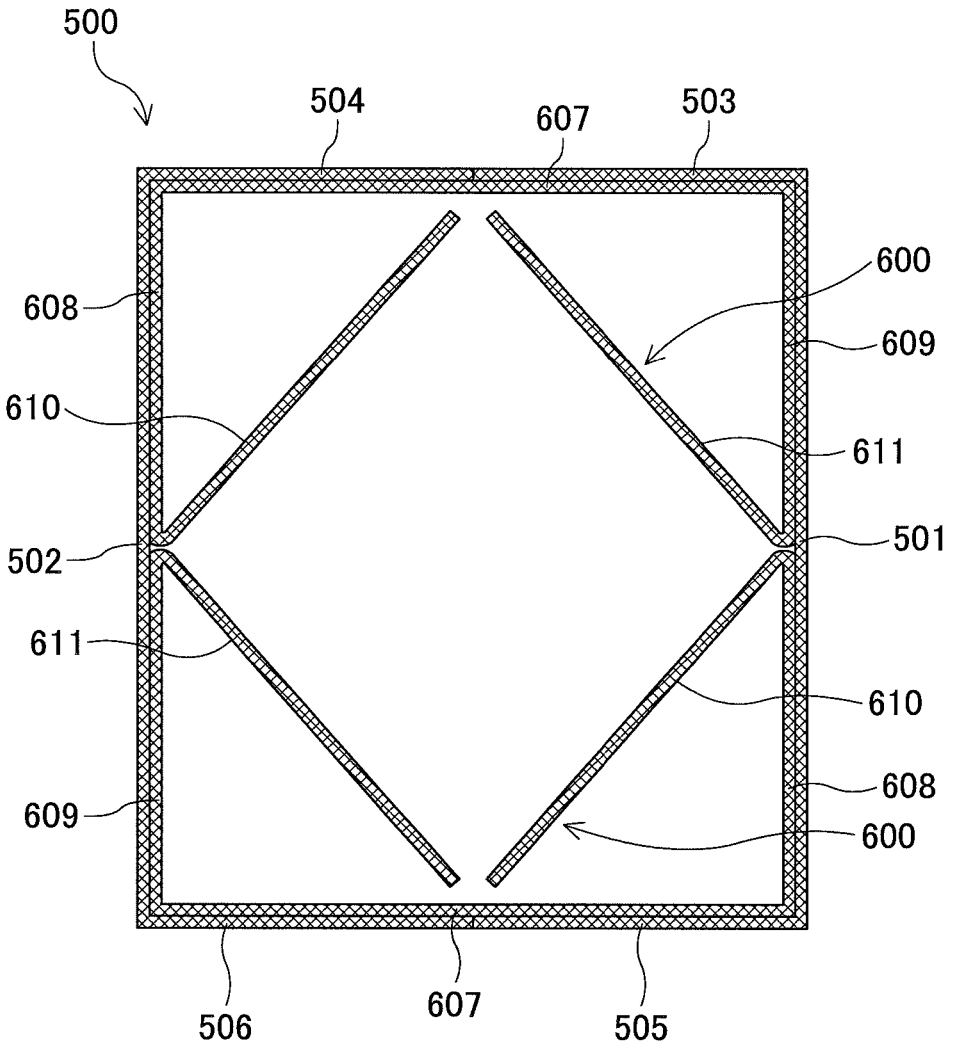
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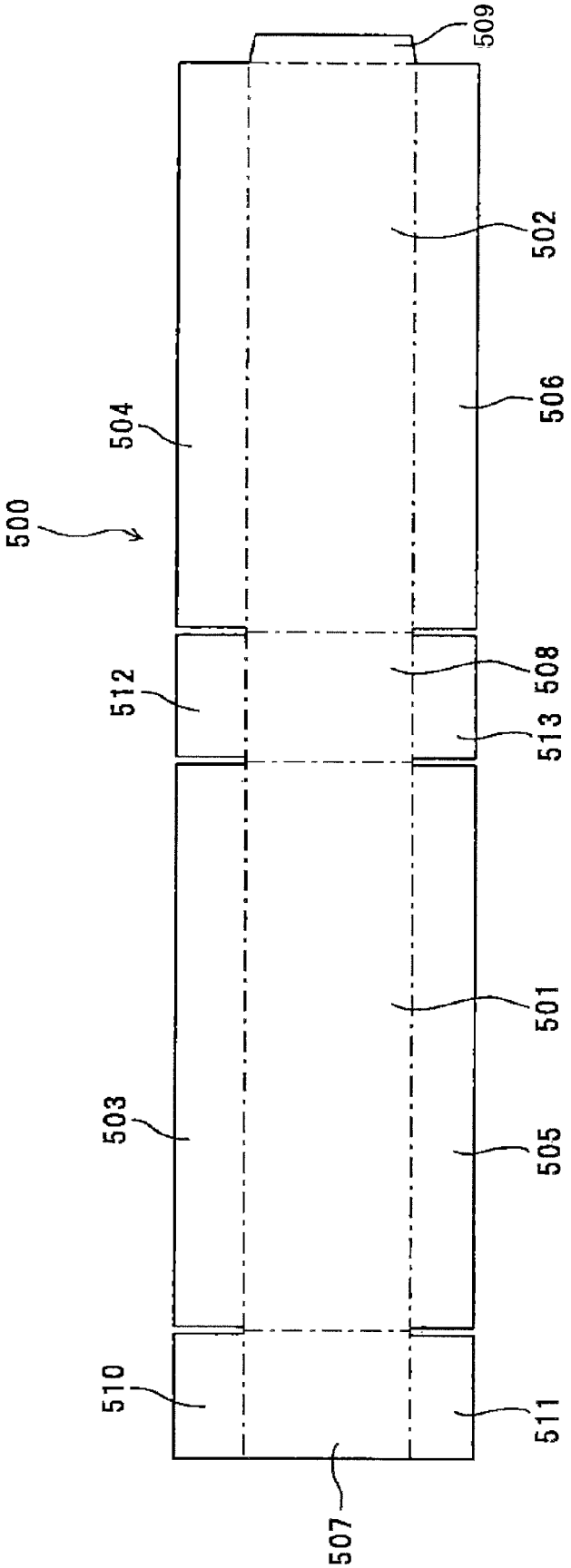
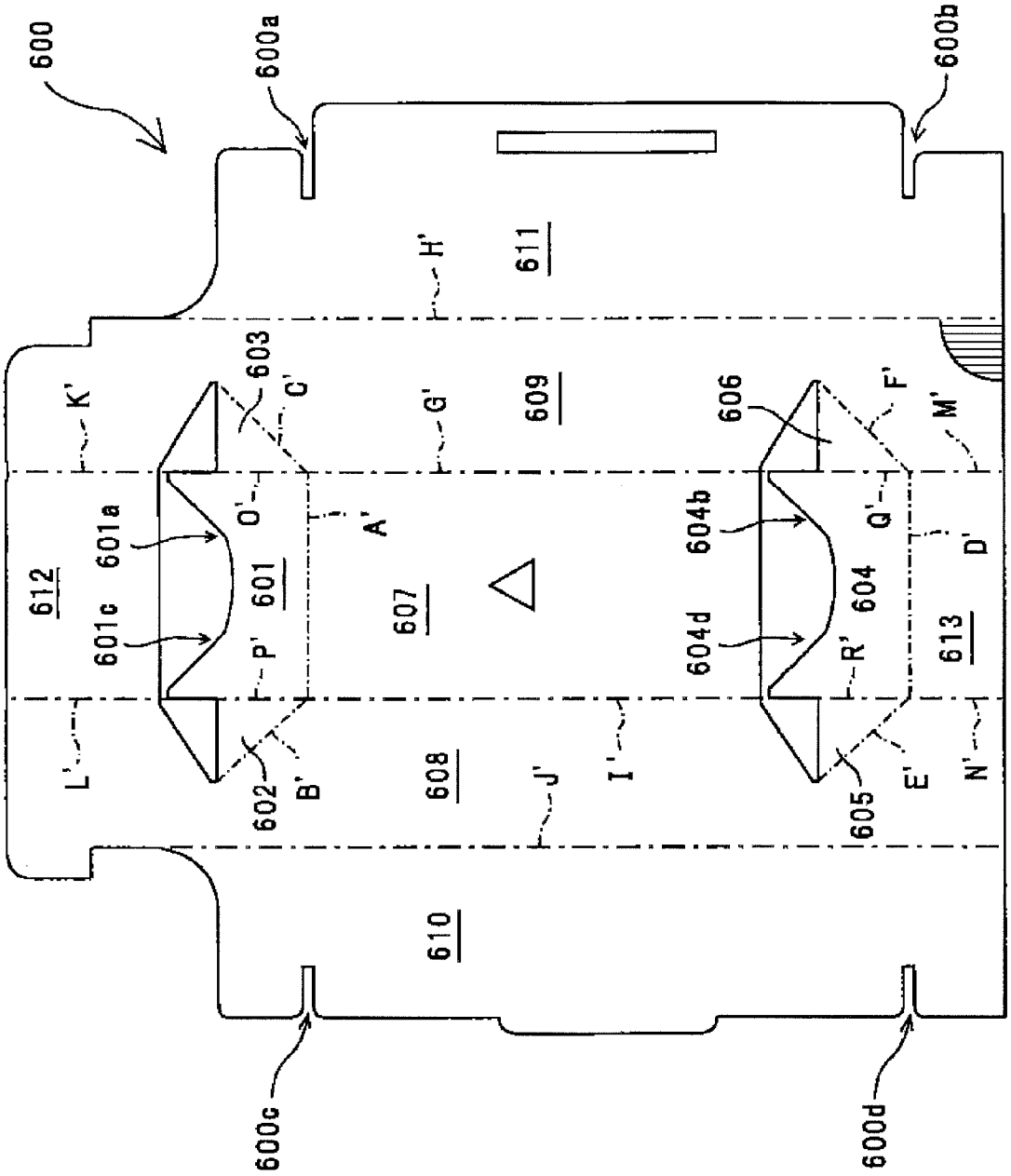
FIG.30

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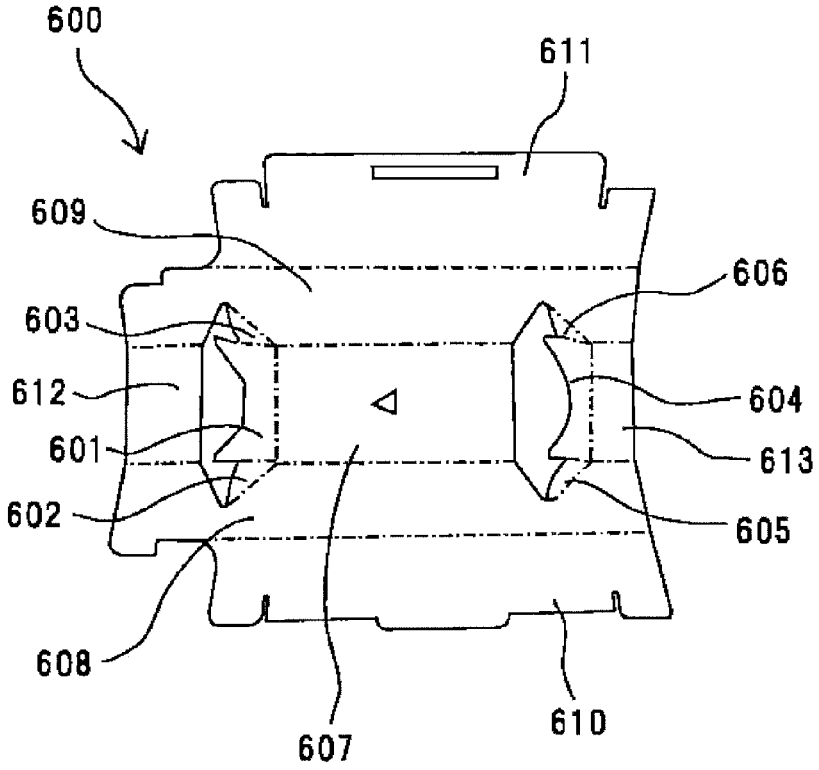
600a
600b
611
H'
K'
603
C'
G'
609
606
F'
M'
612
601a
601c
601
O'
A'
607
604b
604d
604
Q'
D'
613
P'
R'
L'
602
B'
608
J'
I'
605
E'
N'
610
600c
600d

FIG.31

FIG.32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605
608
607
610

FIG.33

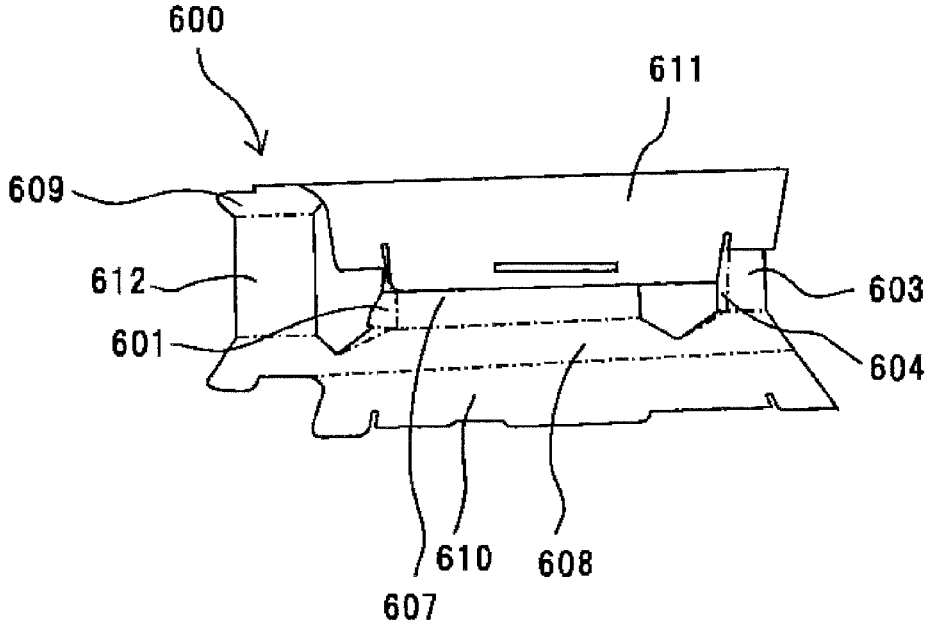
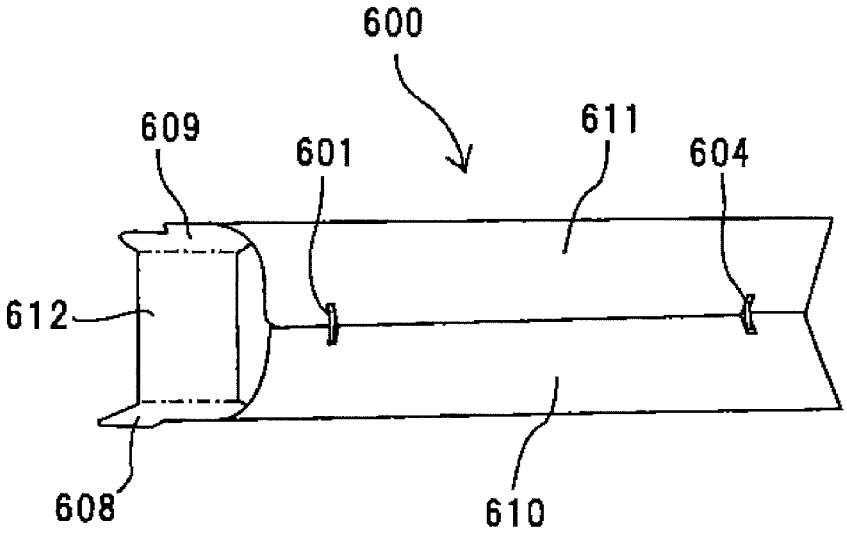

600
611
609
612
603
601
604
610
608
607

FIG.34


600
609
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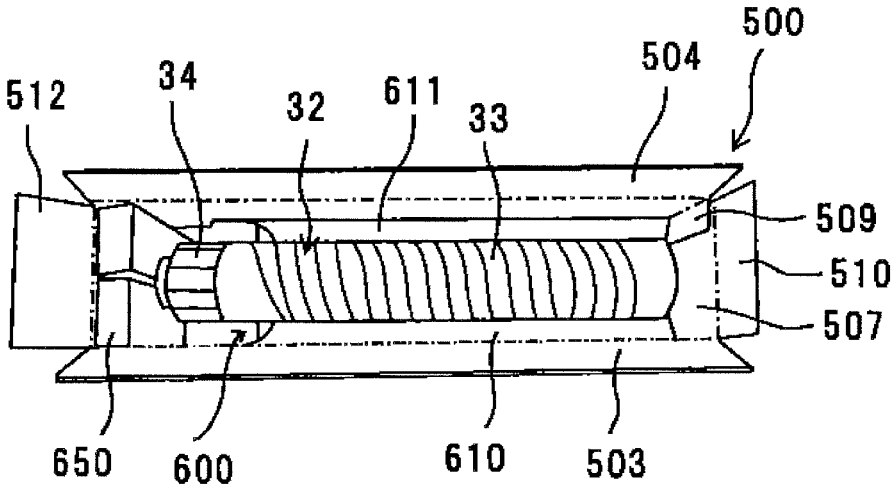
608
610

FIG.35


500
504
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32
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33
509
510
507
650
600
610
503

FIG.36

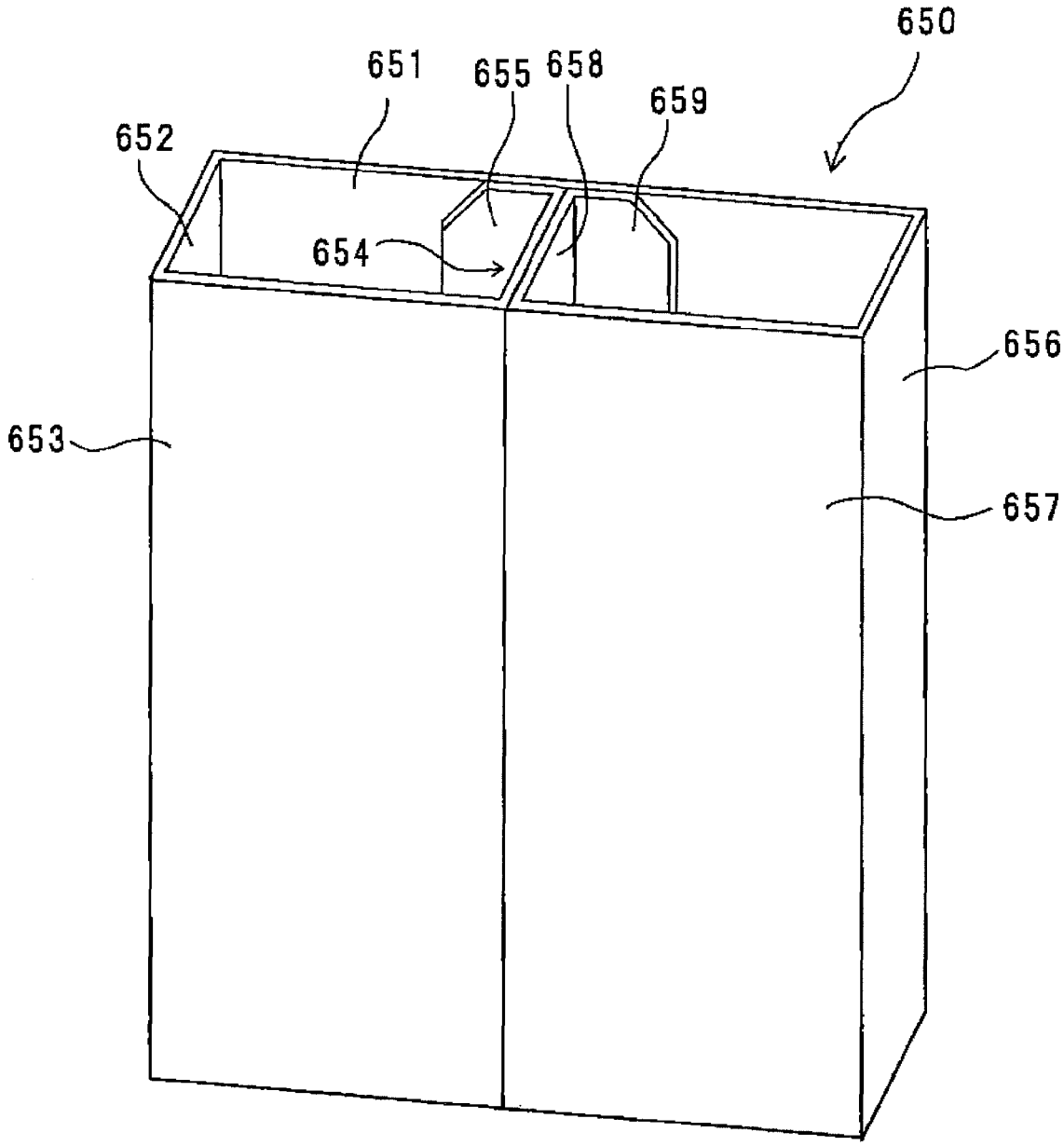


FIG.37

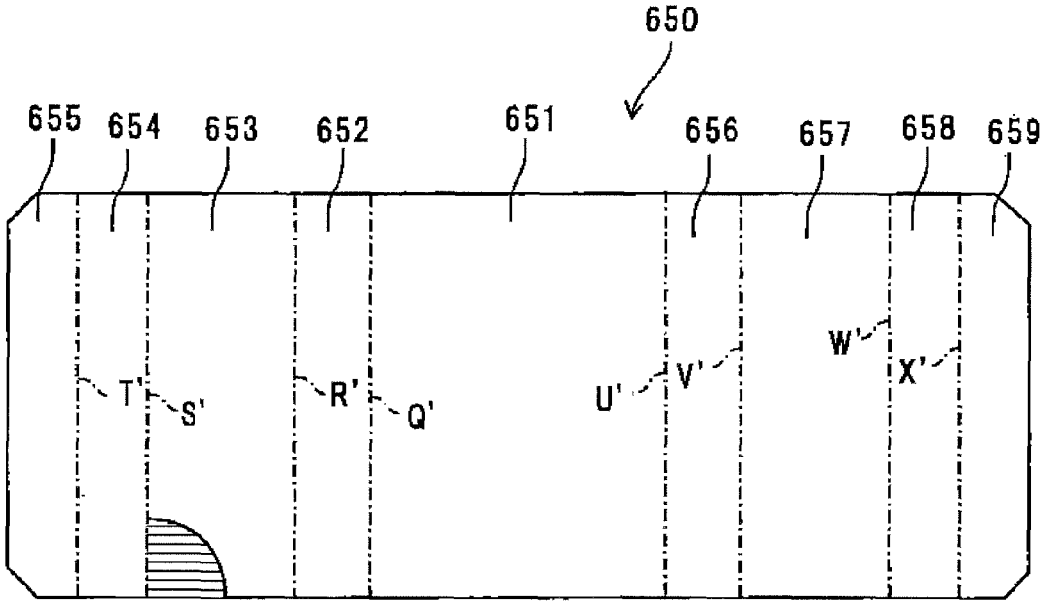
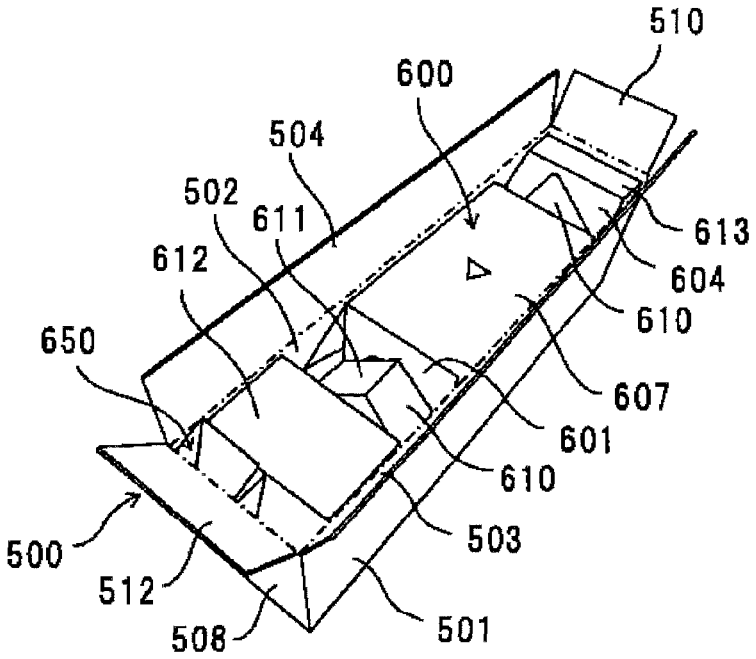

650
655
654
653
652
651
656
657
658
659
T'
S'
R'
Q'
U'
V'
W'
X'

FIG.38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600
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650
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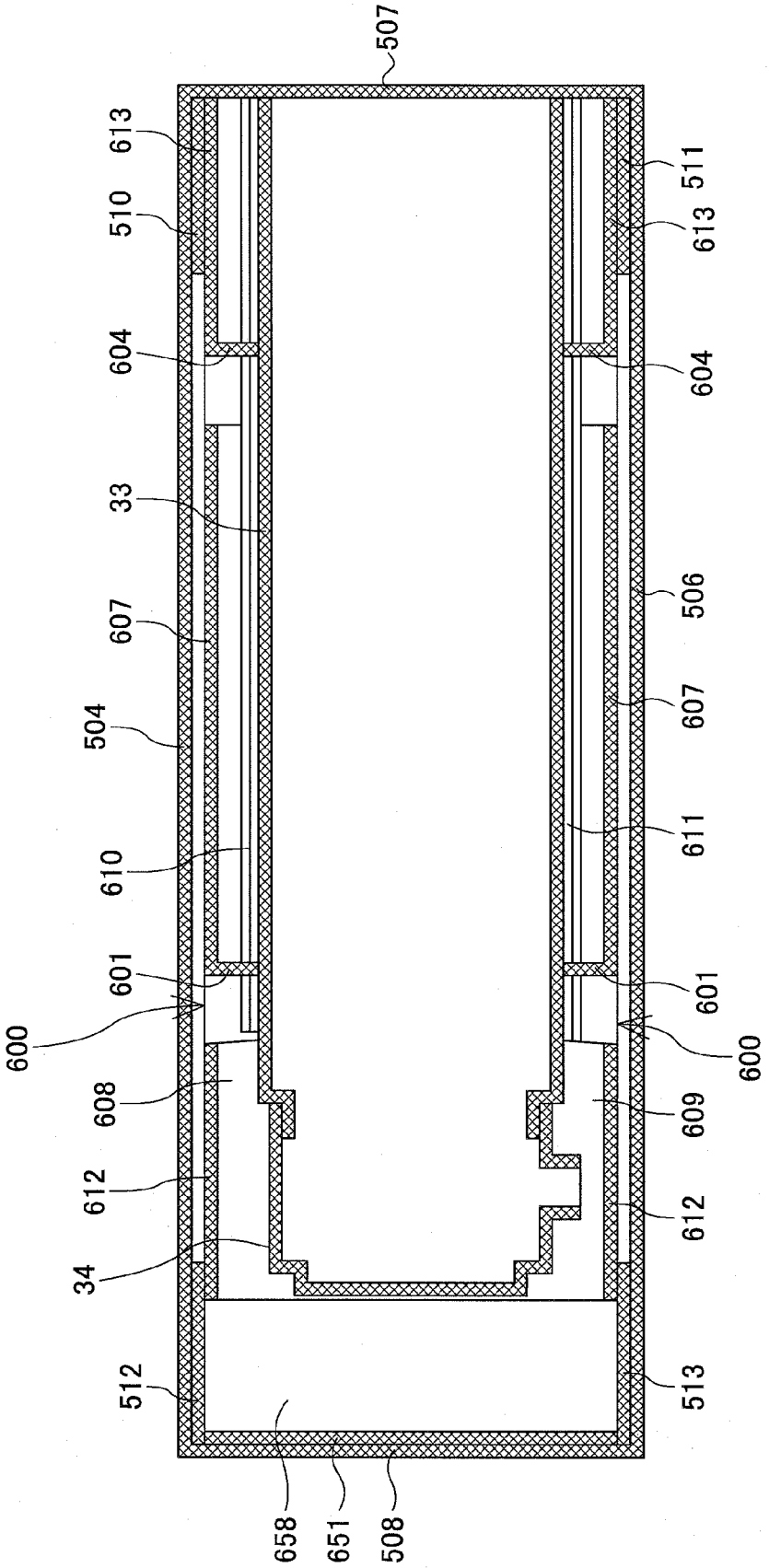
601
610
503
500
512
508
501

FIG.39


507
613
510
604
33
607
504
610
601
600
608
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34
512
658
651
508
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506
607
611
601
600
609
612
513

FIG.40

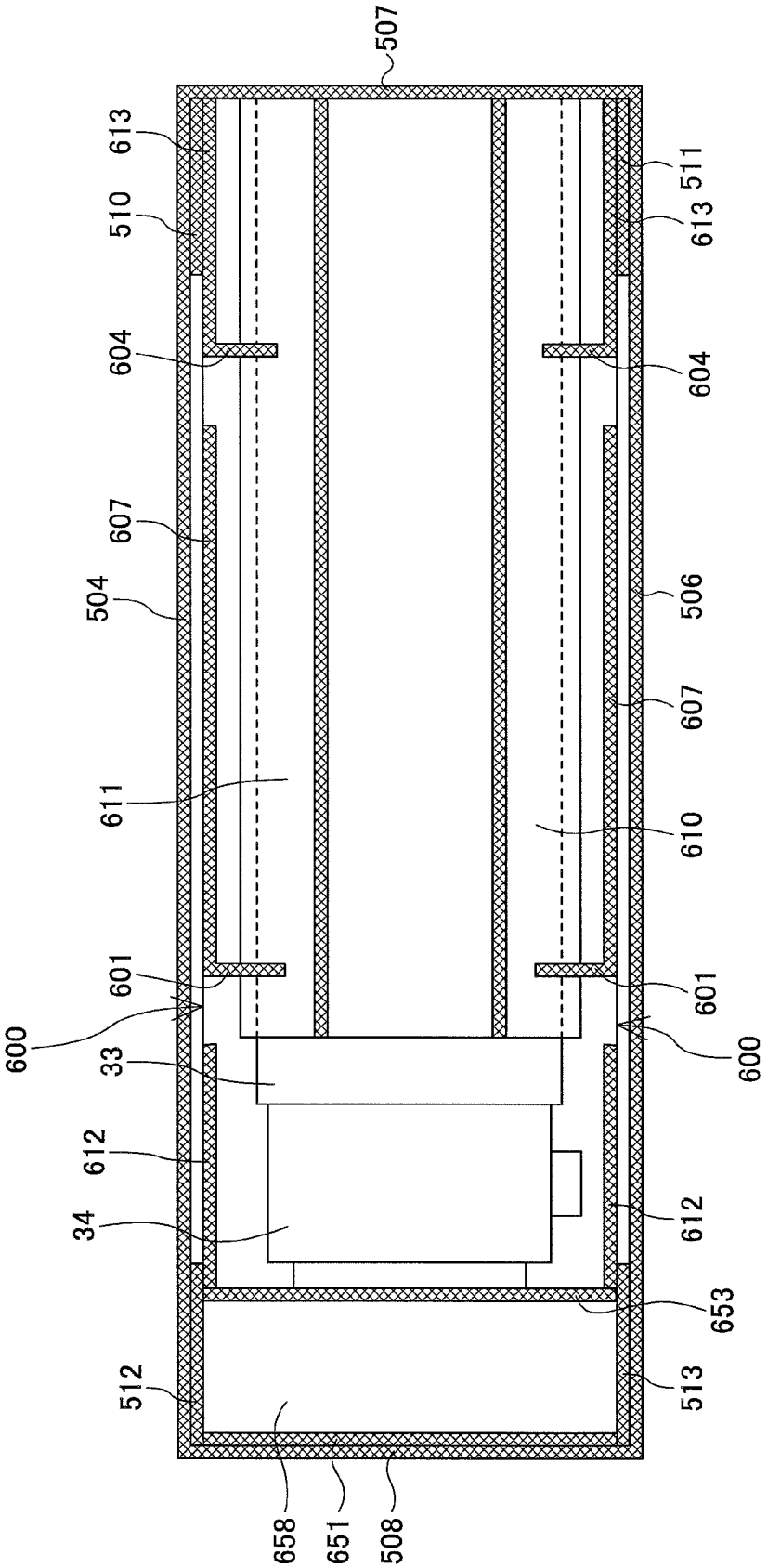

507
613
510
604
607
504
611
601
600
33
612
34
512
658
651
508
511
613
604
506
607
610
601
600
612
653
513

FIG.41

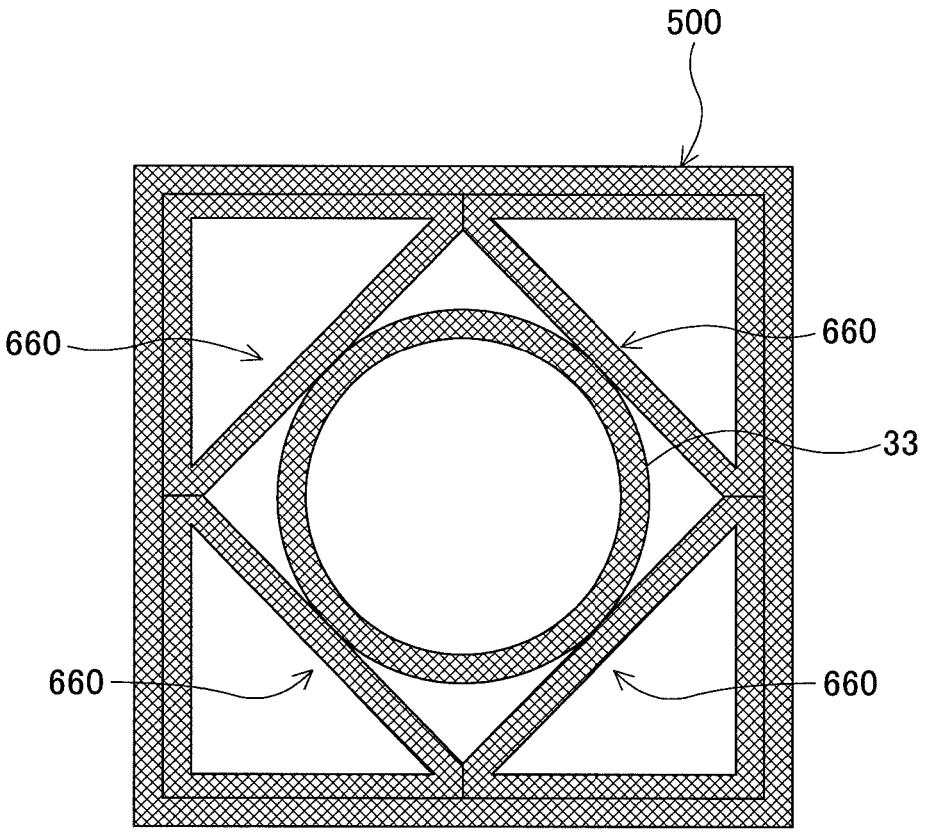


FIG.42

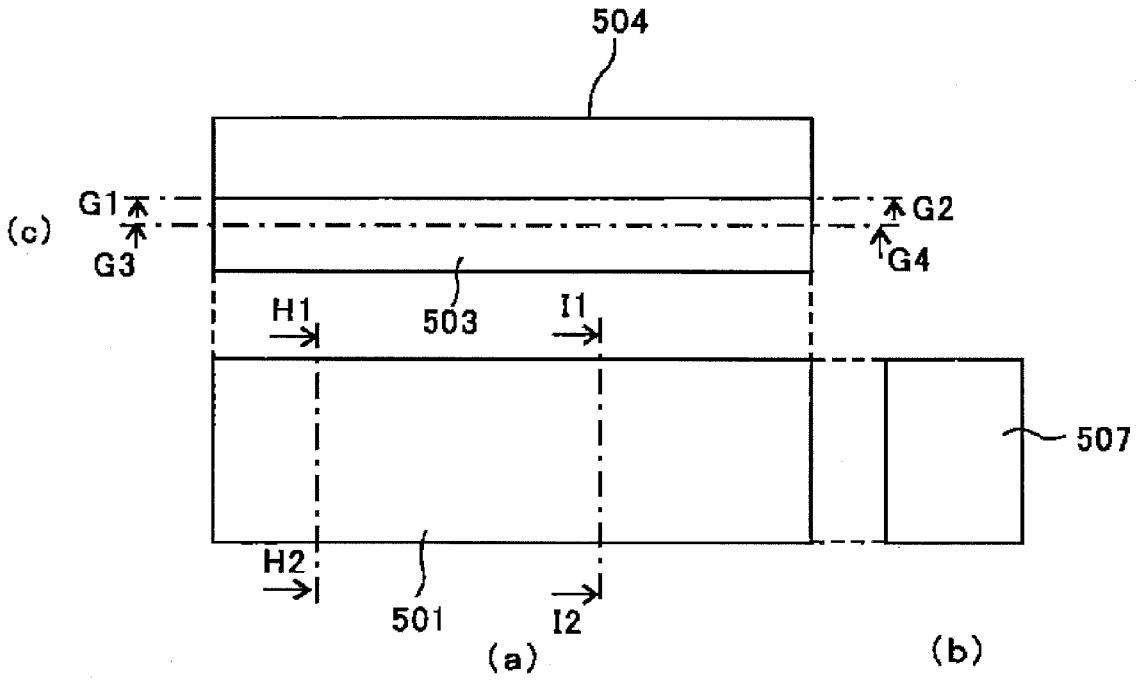


FIG.43

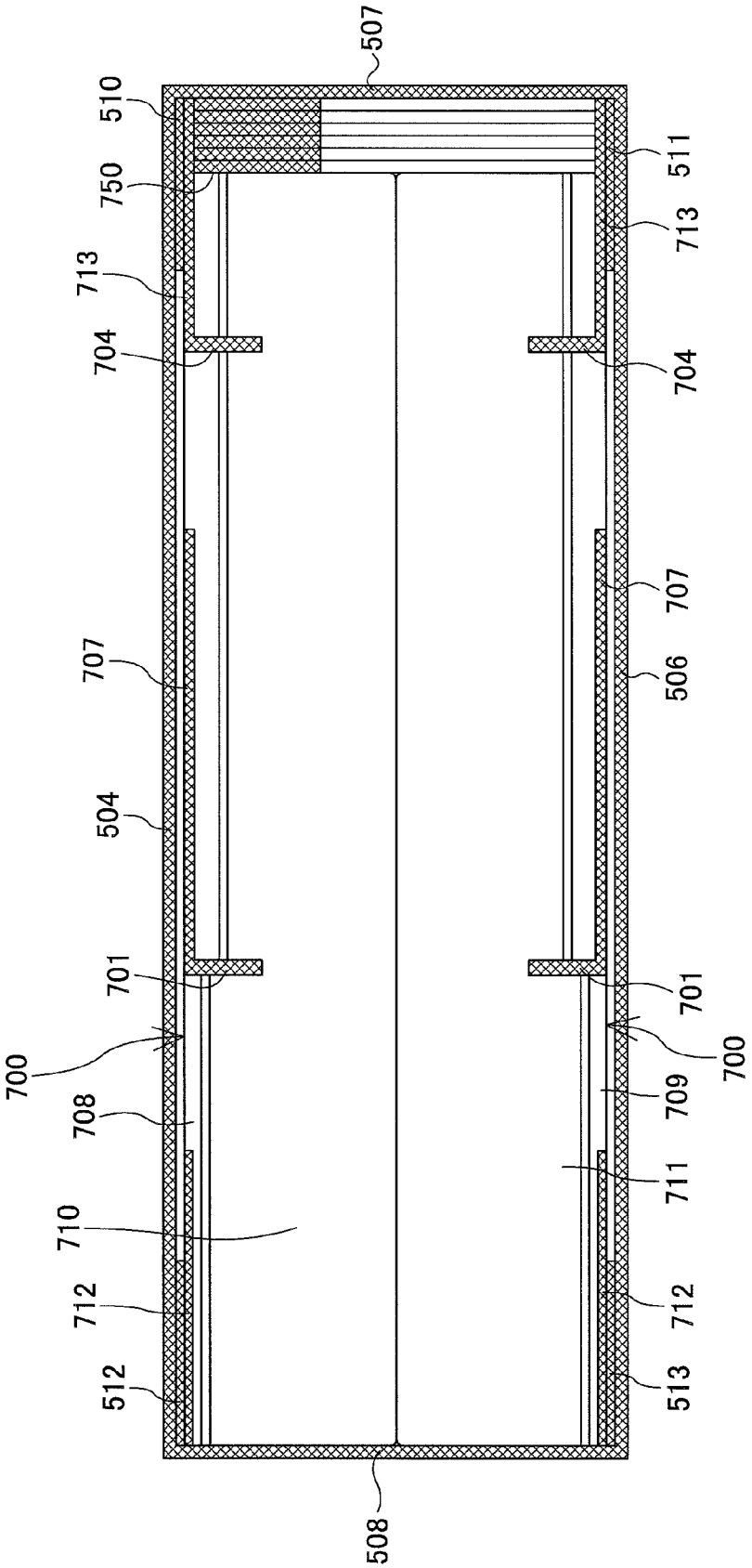

507
510
511
750
713
713
704
704
707
707
506
504
701
701
700
700
709
708
711
710
712
712
513
512
508

FIG.44

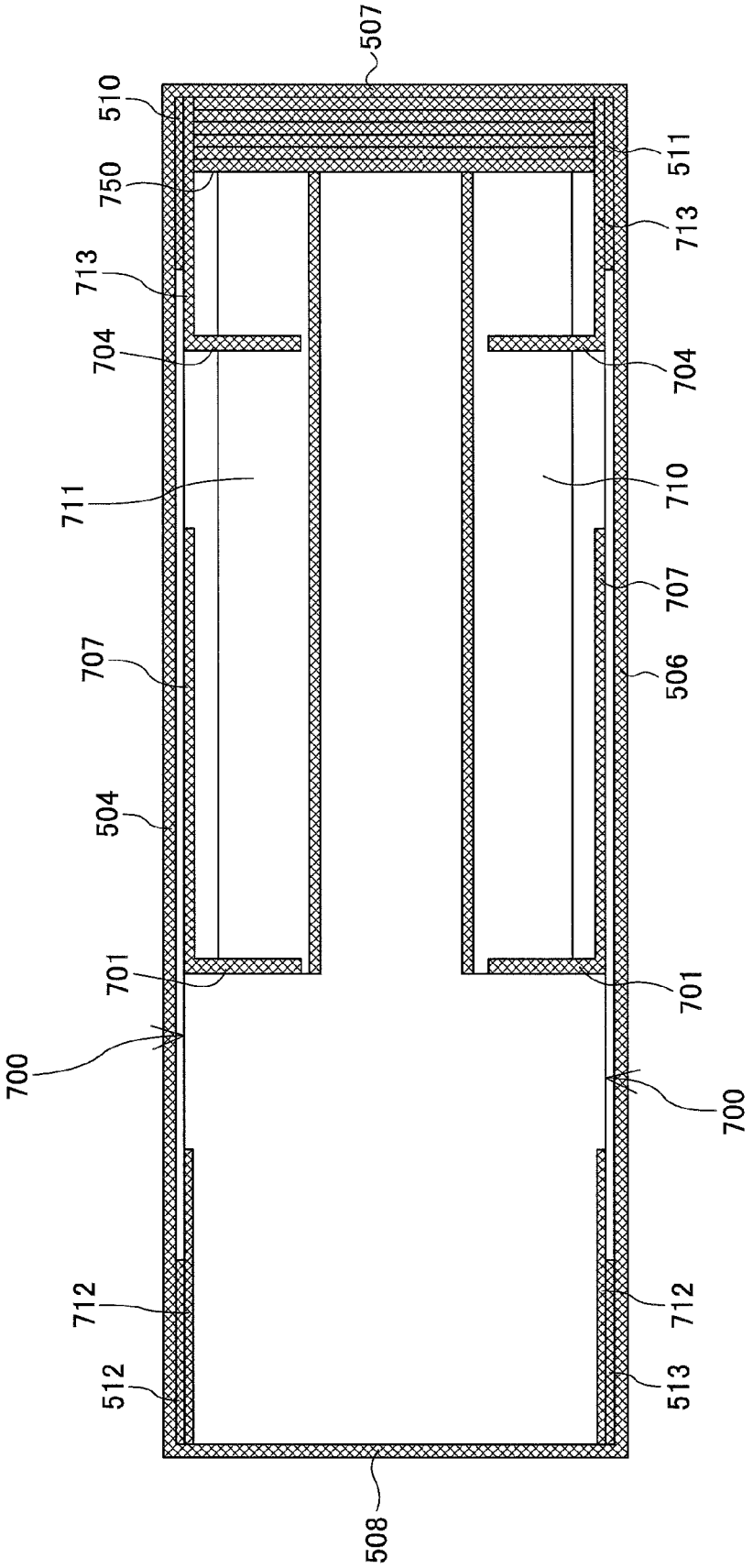

507
510
511
750
713
713
704
704
711
710
707
707
506
504
701
701
700
700
712
712
512
513
508

FIG.45A

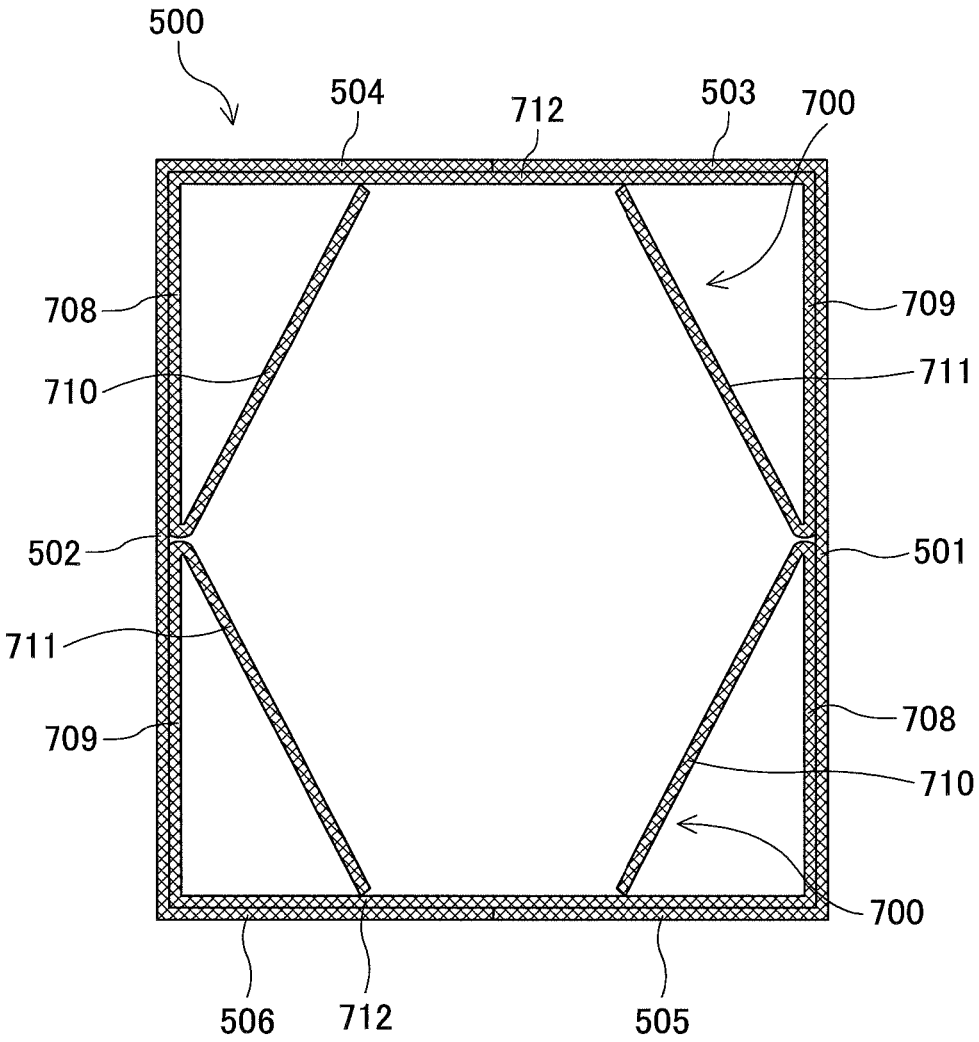
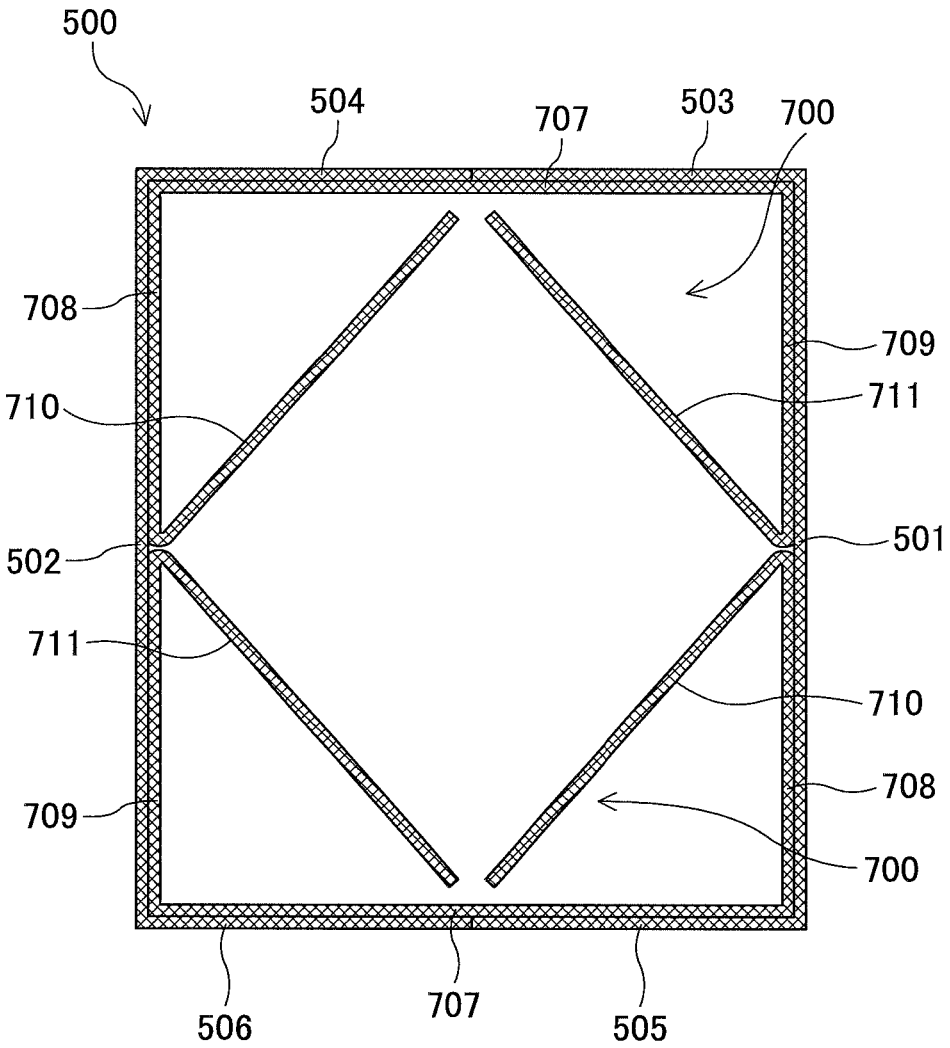

500
504
712
503
700
708
709
710
711
502
501
711
709
708
710
700
506
712
505

FIG.45B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504
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503
700
708
709
710
711
502
501
711
710
709
708
700
506
707
505

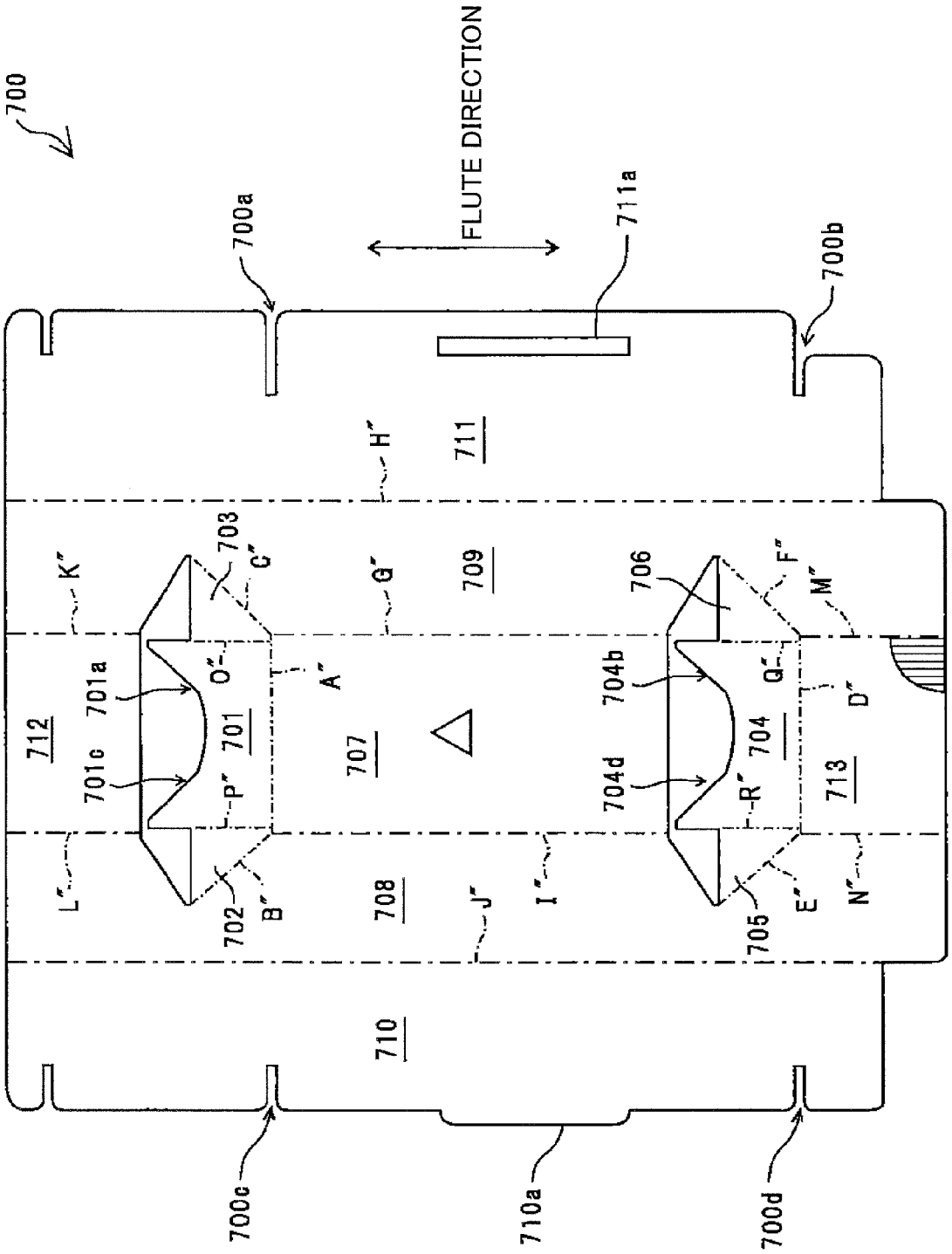
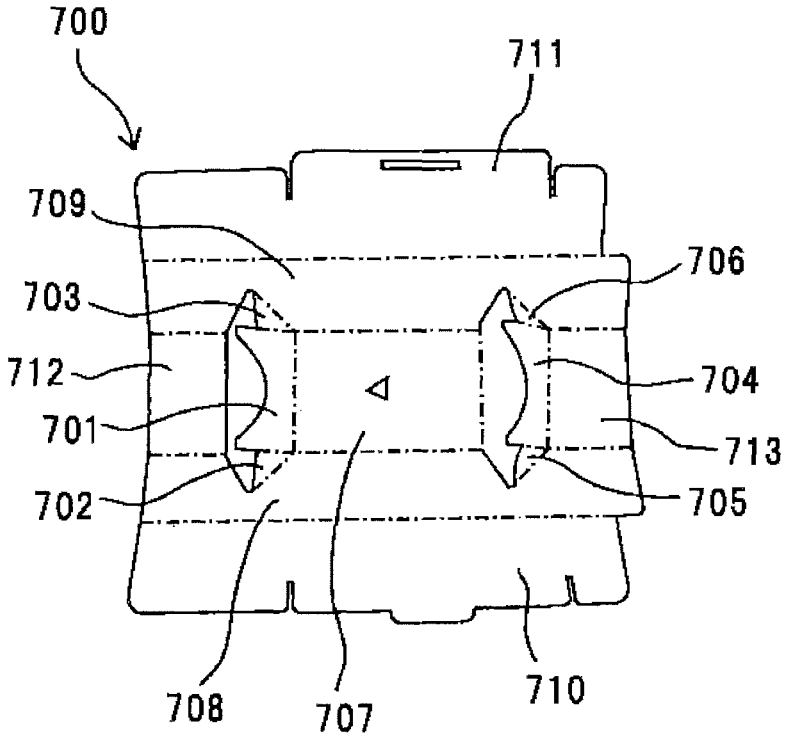

700
FLUTE DIRECTION
700a
711a
700b
711
H″
709
703
C″
K″
G″
706
F″
M″
712
701a
O″
A″
704b
Q″
D″
701c
701
707
704
713
P″
R″
704d
L″
702
B″
708
J″
I″
705
E″
N″
710
700c
710a
700d

FIG.46

FIG.47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711
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706
703
712
704
701
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702
705
708
707
710

FIG.48

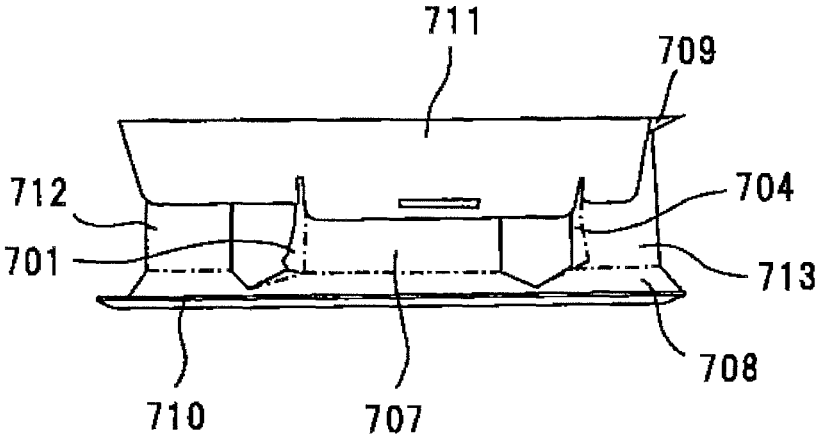

711
709
712
704
701
713
708
710
707

FIG.49

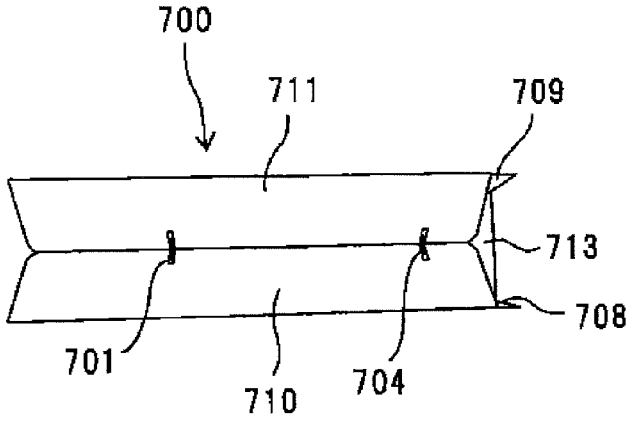

700
711
709
713
708
701
710
704

FIG.50

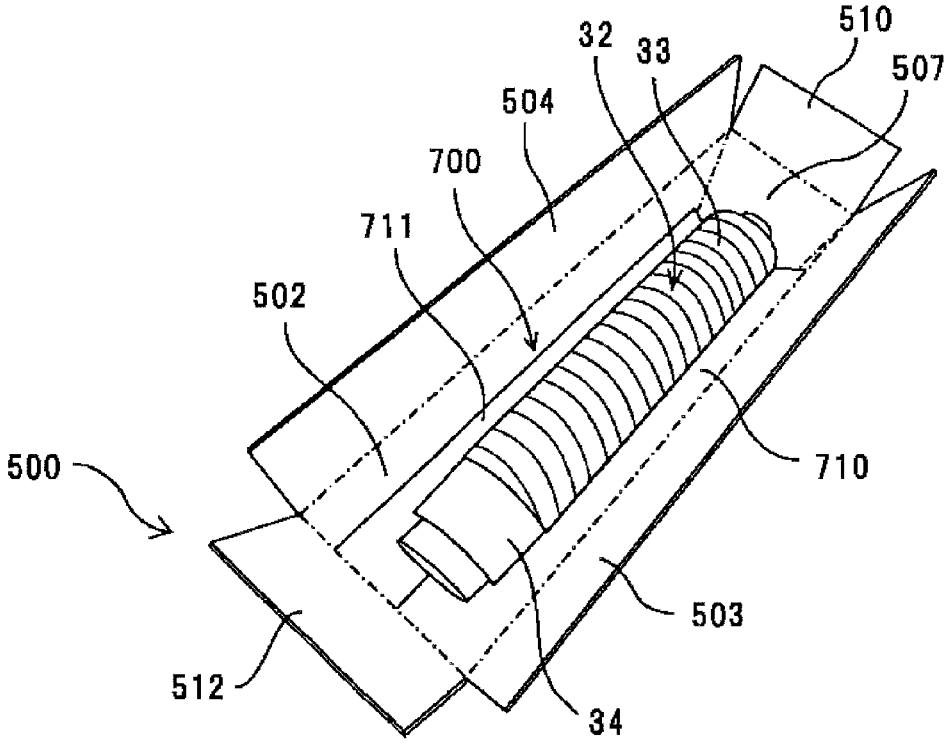

510
32
33
507
504
700
711
502
500
710
503
512
34

FIG.51

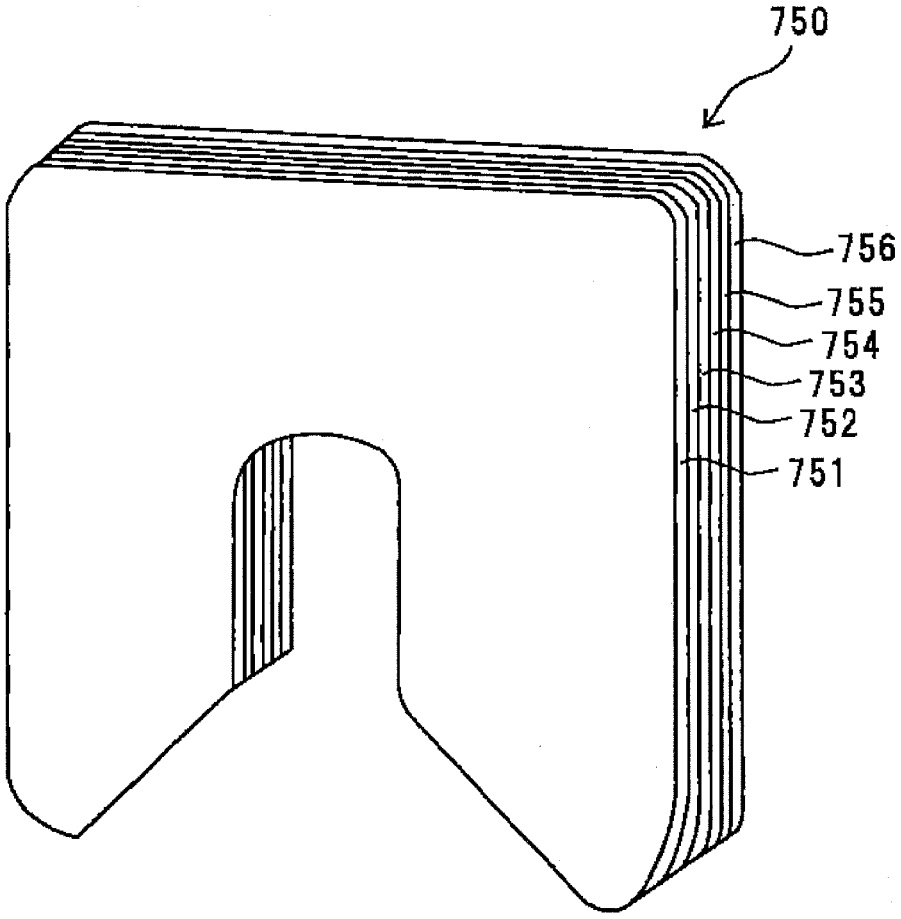


FIG.52

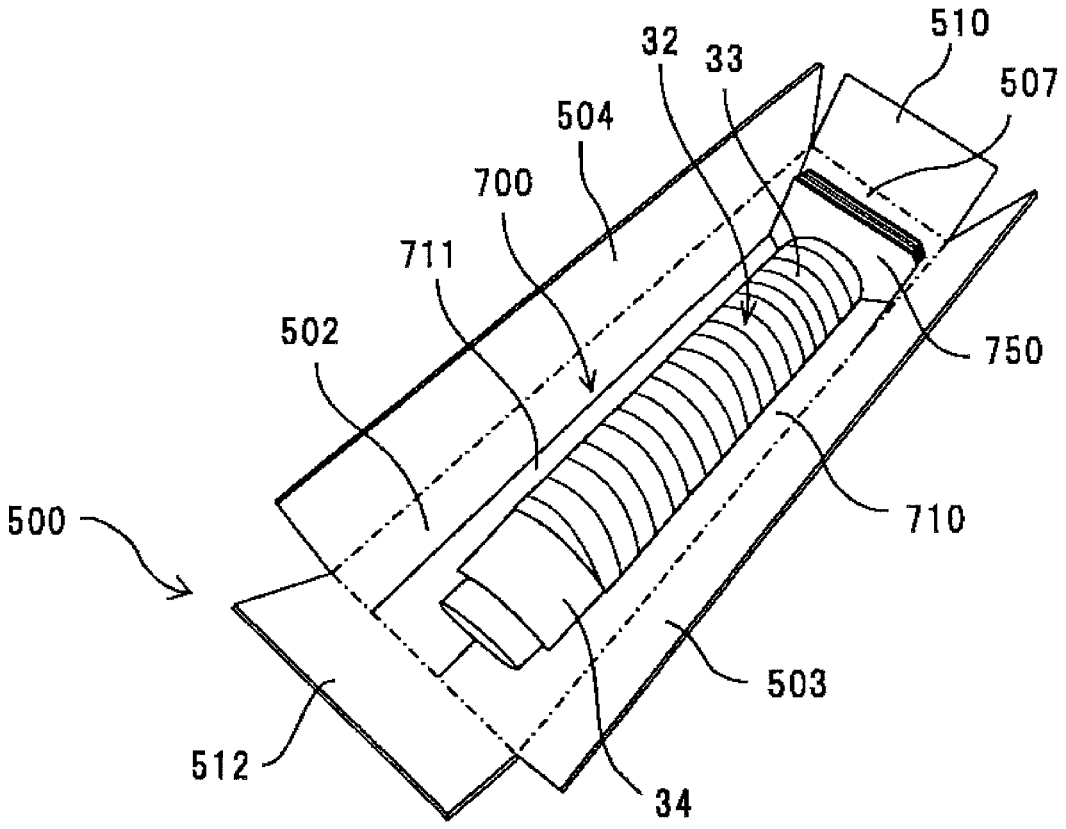


FIG.53

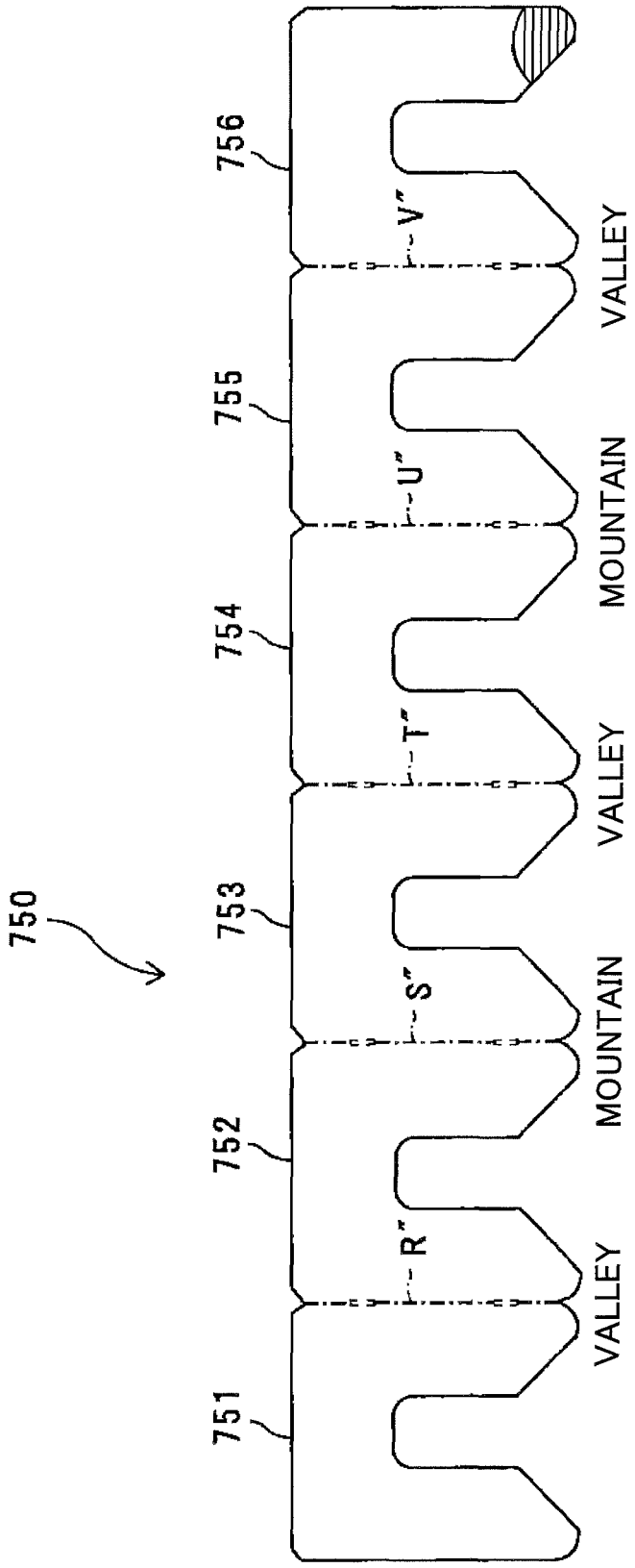

750
751
752
753
754
755
756
R″
S″
T″
U″
V″
VALLEY
MOUNTAIN
VALLEY
MOUNTAIN
VALLEY

FIG.54

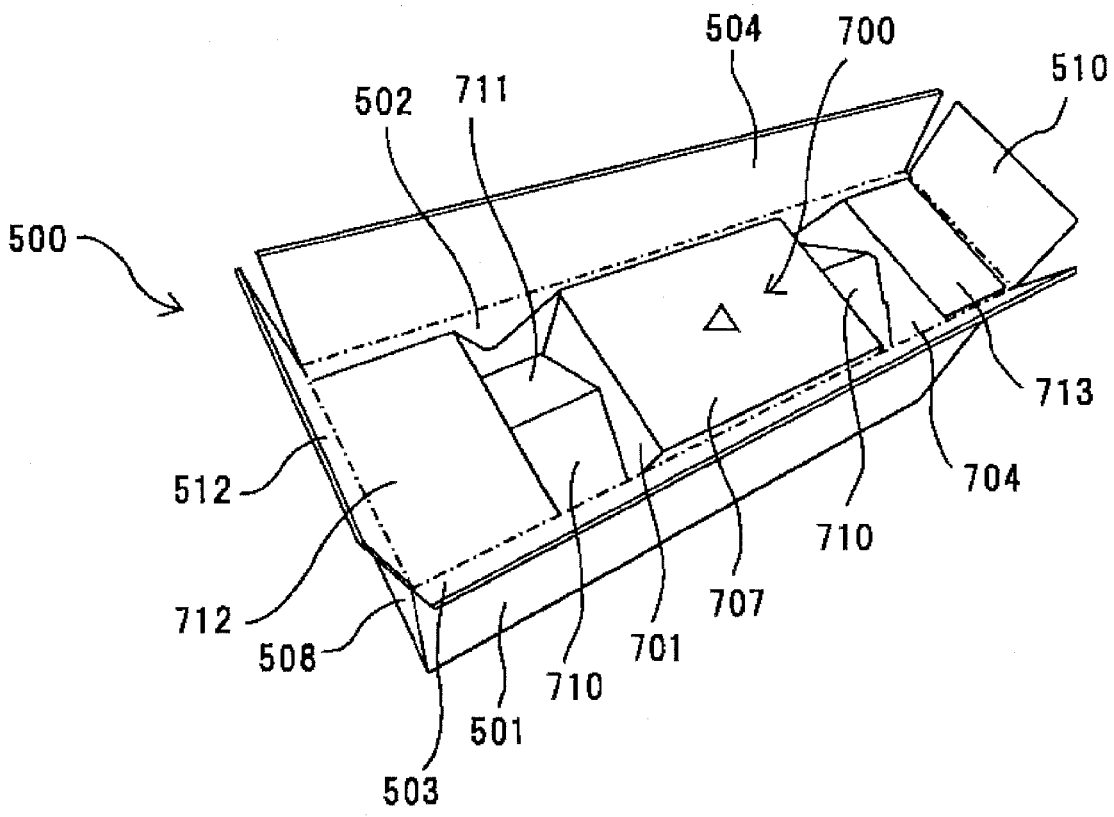
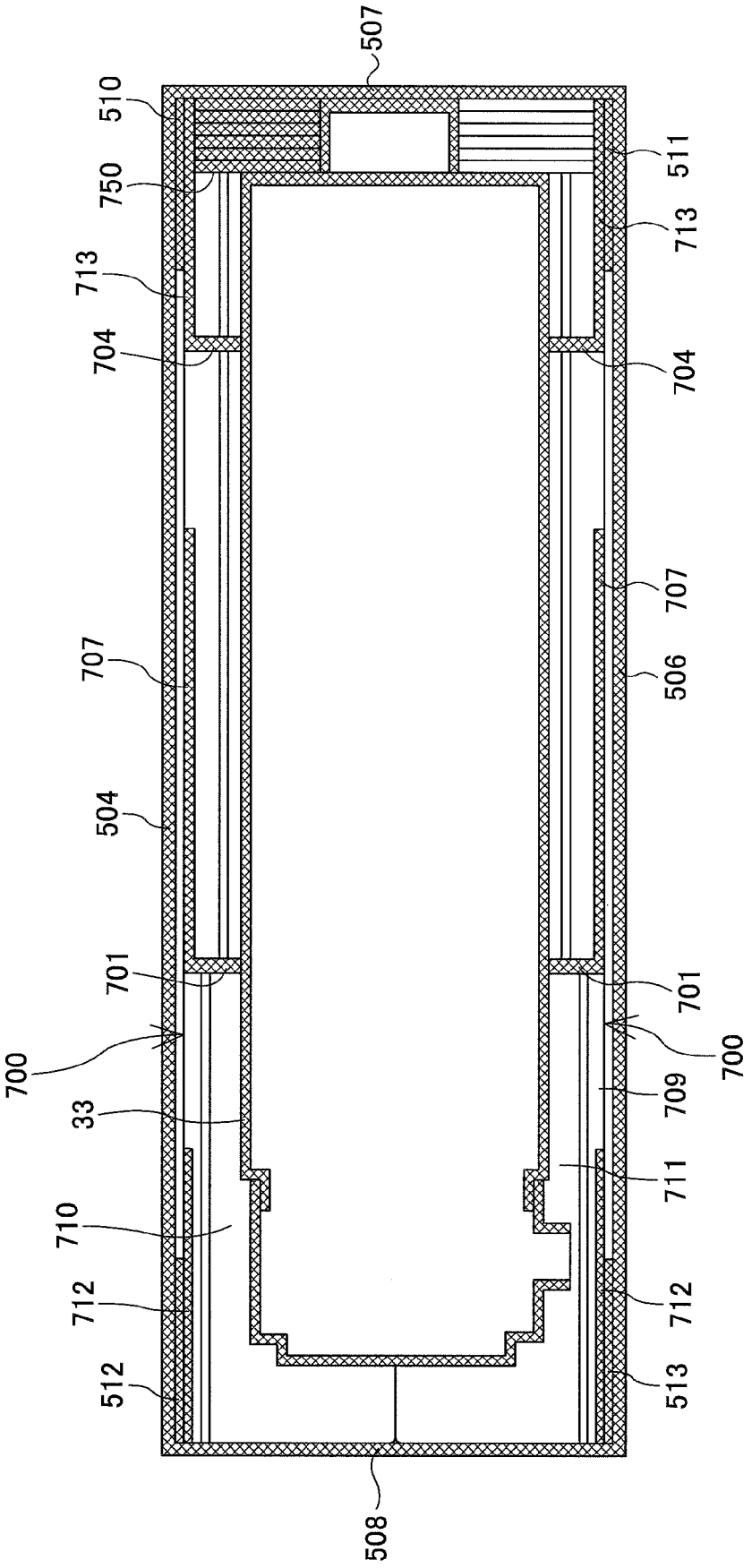

504
700
510
502
711
500
713
512
704
710
712
707
508
701
710
501
503

FIG.55


507
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700
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709
711
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712
712
512
513
508

FIG.56

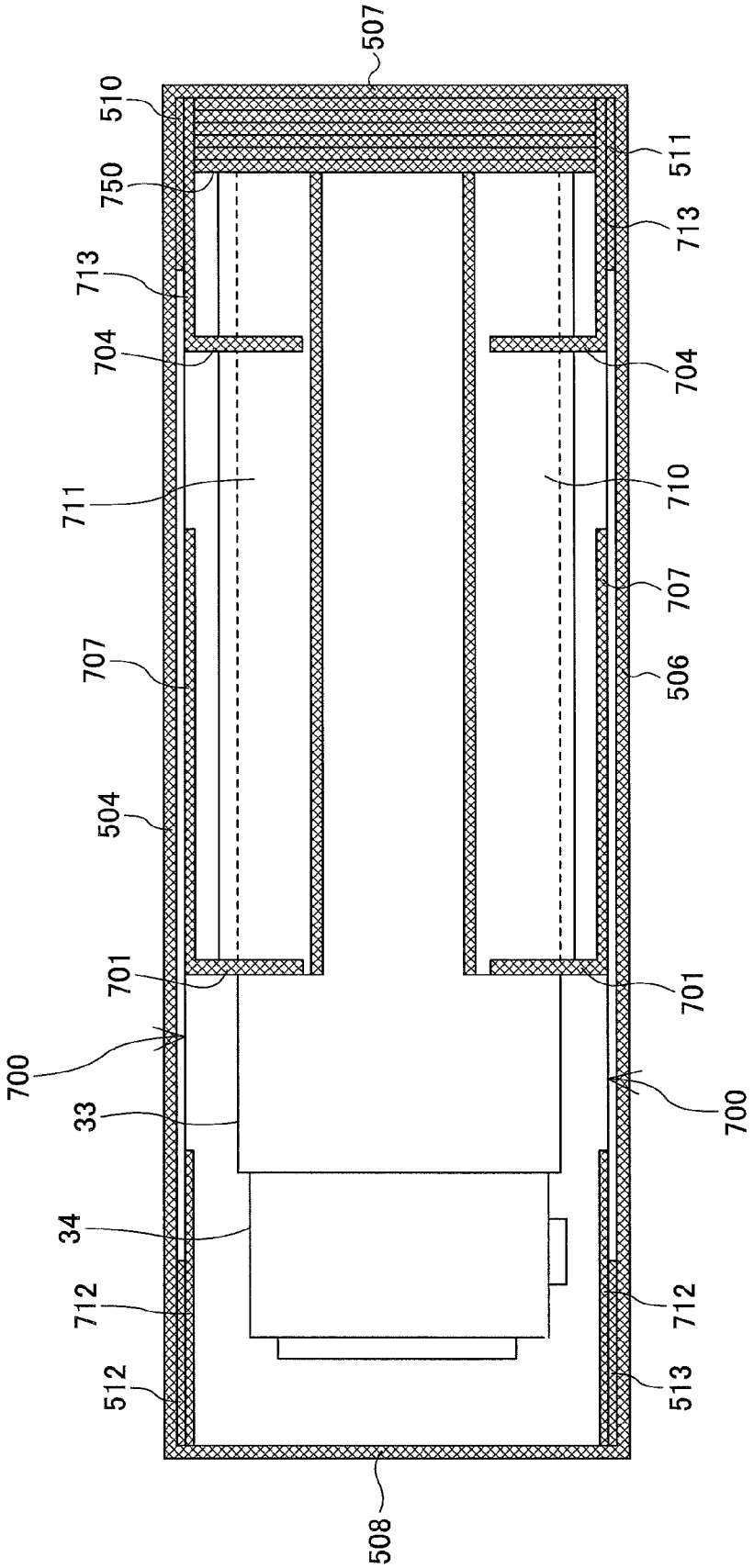

507
510
511
750
713
713
704
704
711
710
707
707
506
504
701
701
700
700
33
34
712
712
512
513
508

FIG.57A

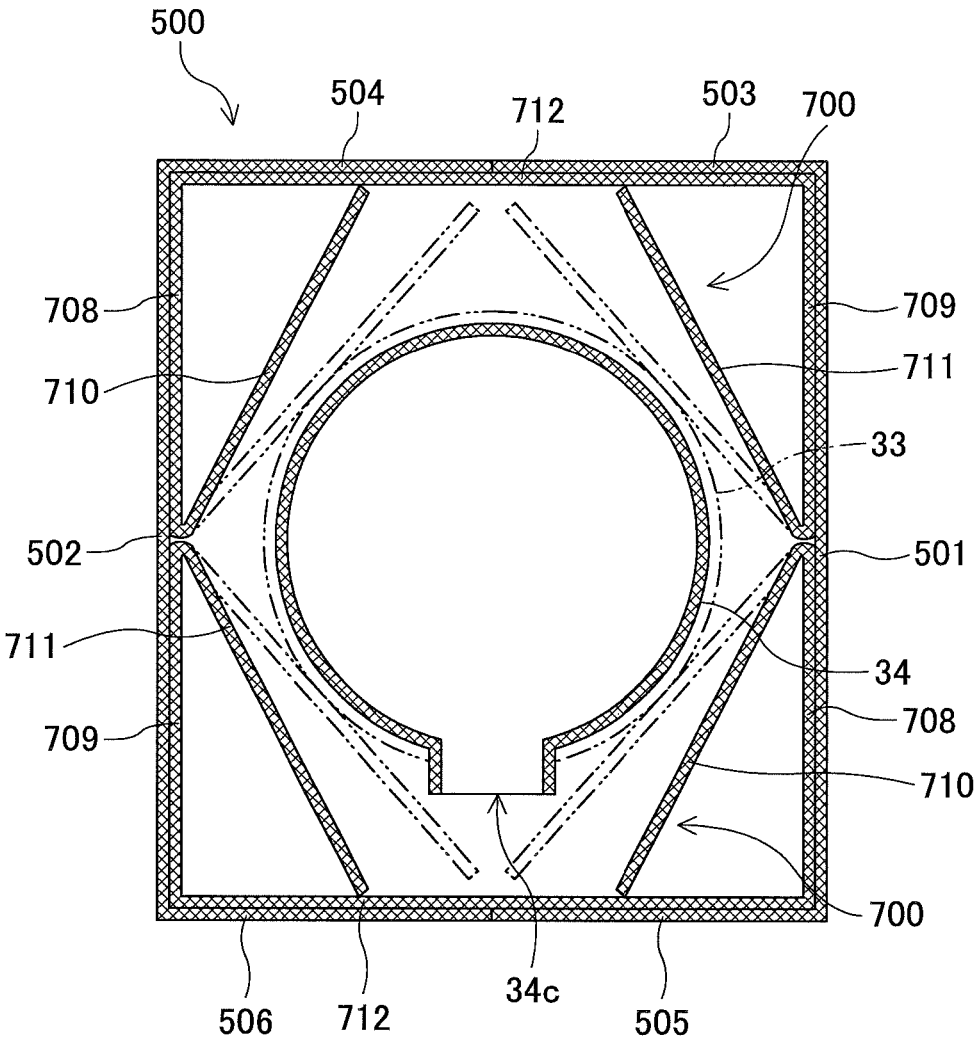
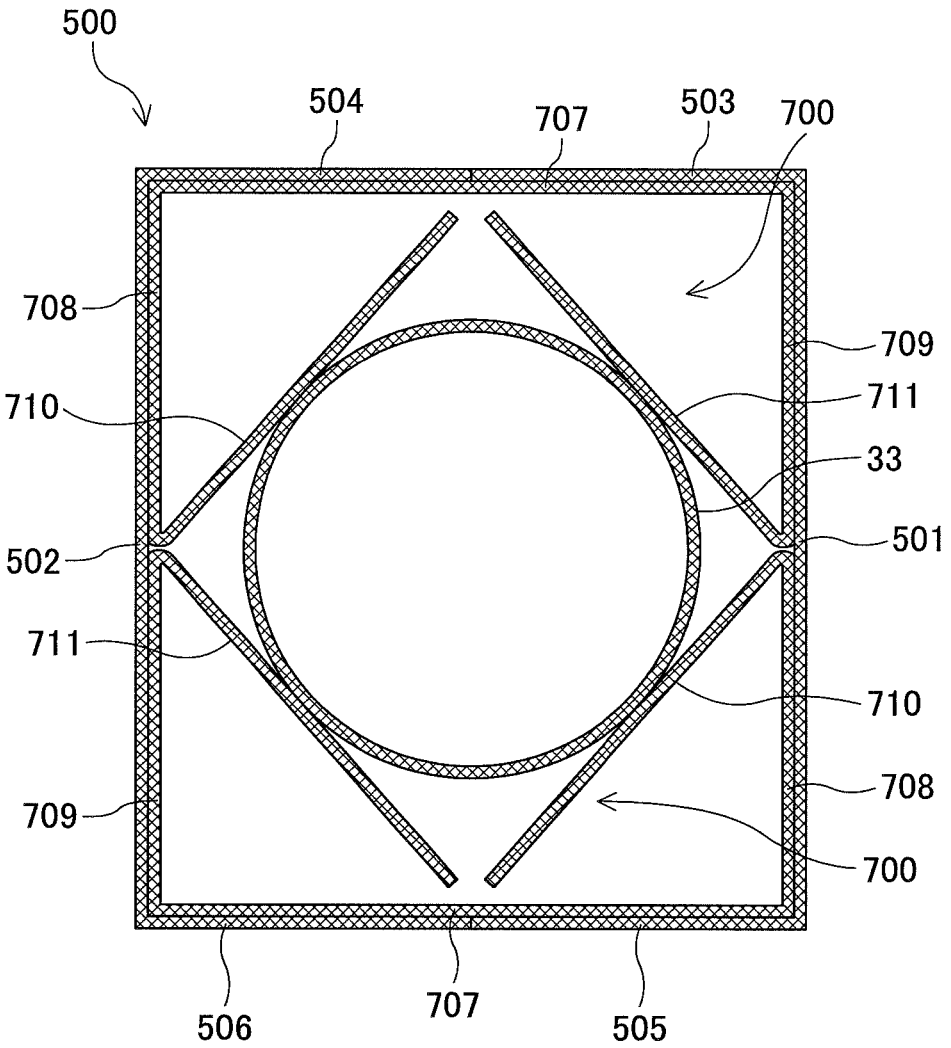

500
504
712
503
700
708
709
710
711
33
502
501
711
34
709
708
710
700
506
712
34c
505

FIG.57B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711
710
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708
700
506
707
505

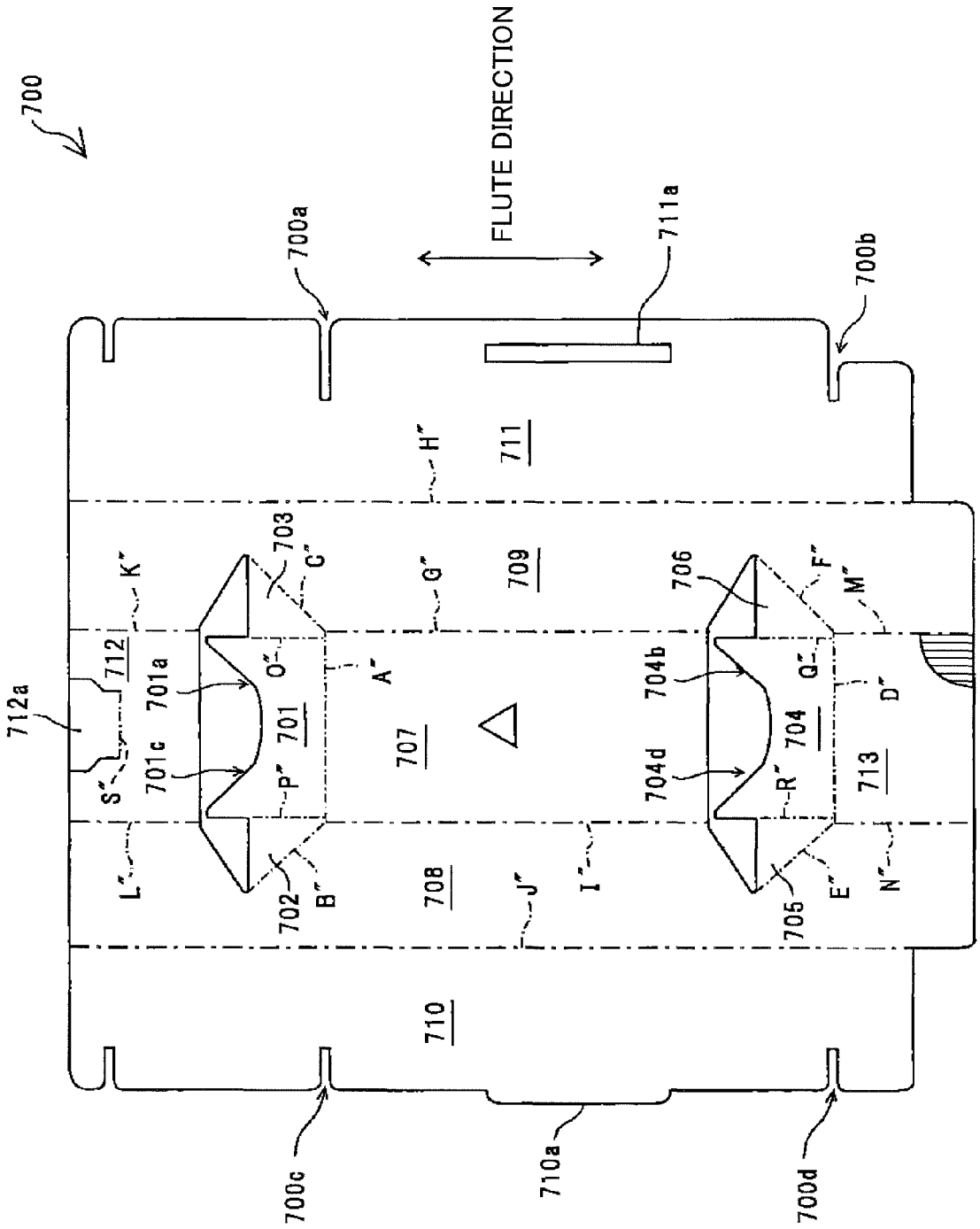
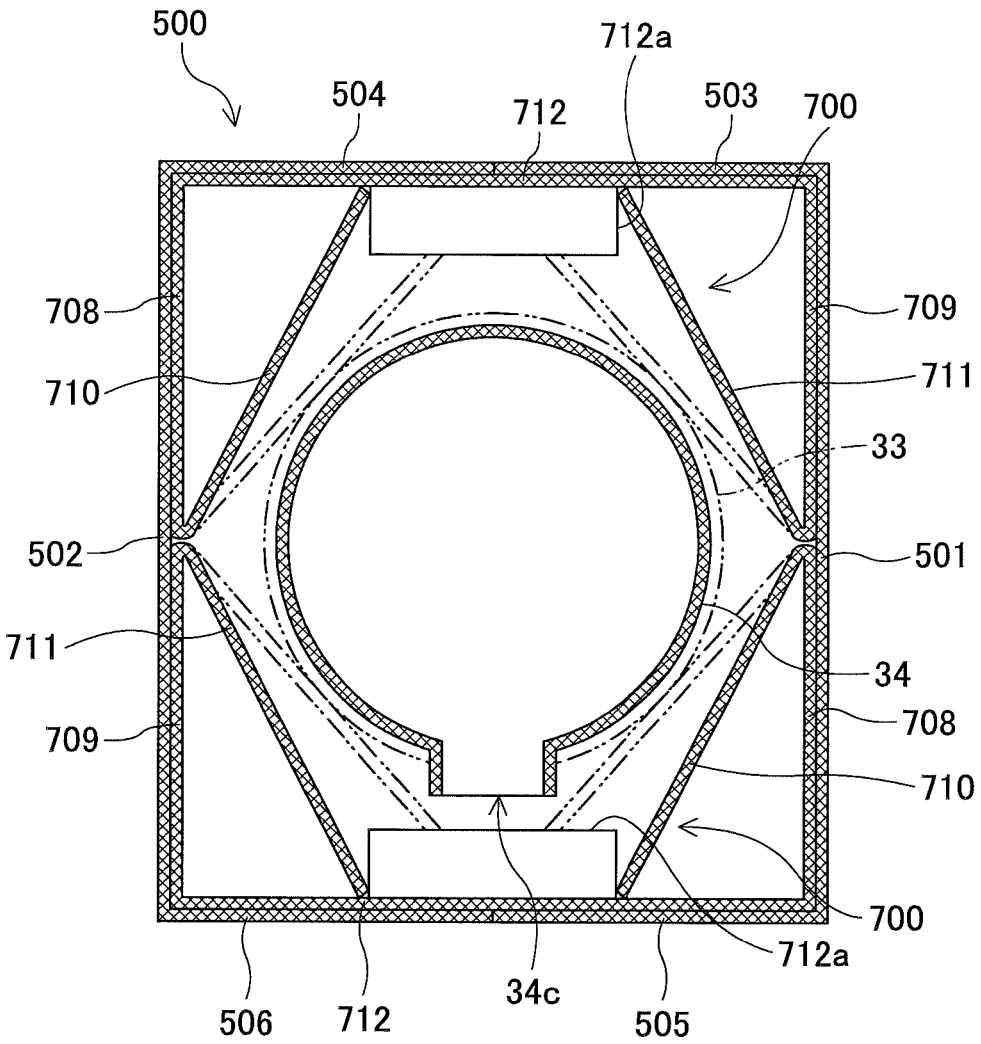

700
FLUTE DIRECTION
700a
711a
700b
H"
711
K"
703
C"
G"
709
706
F"
M"
712
712a
701a
O"
A"
704b
Q"
D"
701c
S"
P"
701
707
704
704d
R"
713
L"
702
B"
708
J"
I"
705
E"
N"
710
700c
710a
700d

FIG.58

FIG.59A


500
712a
504
712
503
700
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711
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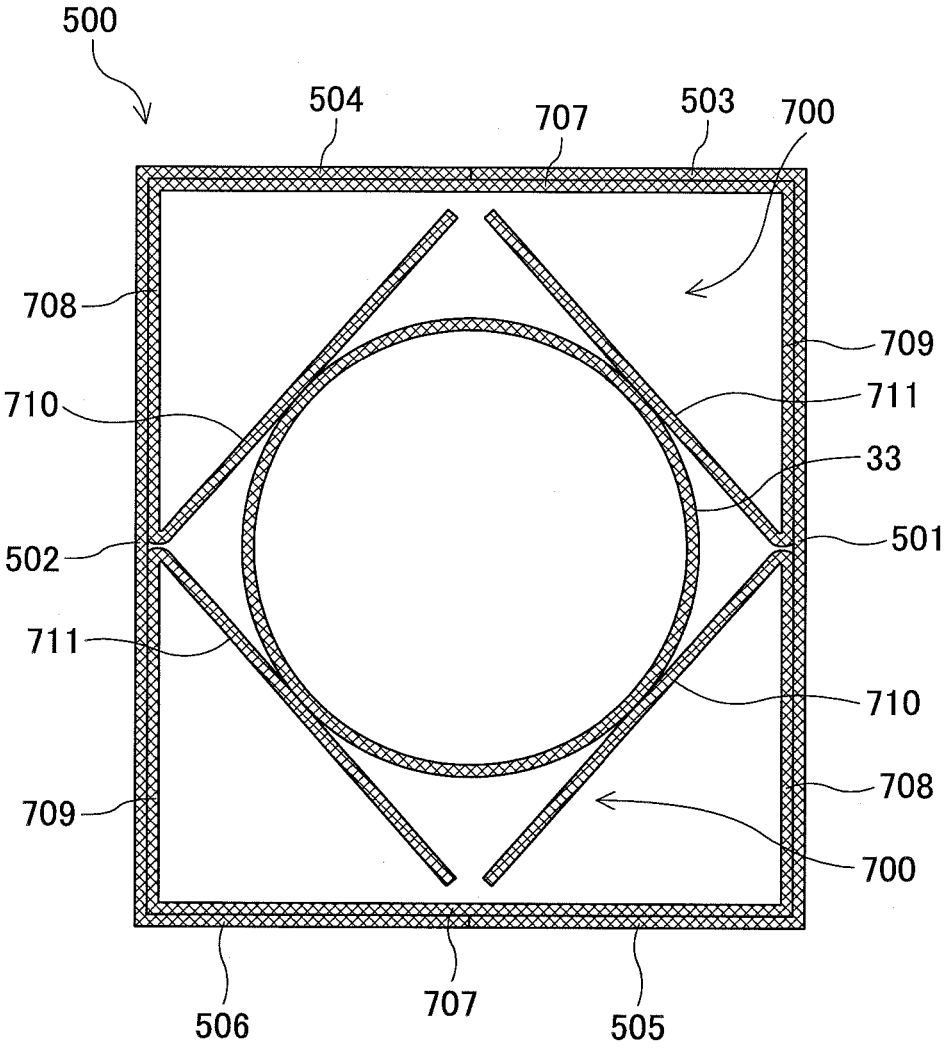
502
501
711
34
709
708
710
700
712a
506
712
34c
505

FIG.59B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505

PACKAGING MEMBER AND PACKAGING METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a packaging member to be used for packaging a to-be-packaged member and a packaging method for packaging a to-be-packaged member.

2. Description of the Related Art

In the related art, an image forming apparatus is known in which a cylindrical toner container containing toner is detachably provided to an image forming apparatus body, and the toner is supplied to a development unit of the image forming apparatus body from the toner container (see Japanese Laid-Open Patent Application No. 2004-287404).

The toner container includes a container body and a bottle cap. On the face of one end of the container body, an opening having a diameter smaller than the container body is provided. In a state where the edge of the opening is in contact with a sealing member installed at a sealing member installation part provided on a bottle cap, the container body and the bottle cap engage together at an engagement part. Further, as a result of the sealing member being used to seal between the container body and the bottle cap so as to prevent any gap from occurring therebetween, it is possible to prevent the toner from leaking from the inside of the toner container to the outside.

The toner container is transported in a state where it is stored in a packaging box when it is shipped from a factory or so. However, when a shock is given to the packaging box from the outside, for example, as a result of the container box being dropped during the transportation, the shock may transmit to the toner container in the inside of the packaging box, and the toner container may be damaged. Therefore, for example, a pair of cushioning members are installed onto the bottle cap and the container body in such a manner to sandwich the toner container from axial directions of the toner container, the toner container is contained in the packaging box together with the cushioning members in this state, and thus, the cushioning members ease the shock transmitting to the toner container.

However, even when the shock is eased by the cushioning members, the shock given to the container body from the outside may reach the container body or the bottle cap, and a force may be applied to the bottle cap in the axial directions of the toner container such that the bottle cap may be inclined with respect to the container body. When such a force is applied to the bottle cap, the sealing member between the bottle cap and the toner container may be shifted, a gap may be created between the bottle cap and the toner container, and the toner may leak through the gap.

Further, also in a case where a to-be-packaged member to be contained in the packaging box via the cushioning members is other than the toner container, various problems may occur as a result of a shock being given to the packaging box from the outside. For example, even when the packaging box receives a shock from the outside and the shock is eased by the cushioning members, the shock may be transmitted to a predetermined part of the to-be-packaged member such as a place where high accuracy of form is required or a place where a precision member such as an electronic part is installed. If so, the place where high accuracy of form is required may be deformed and the high accuracy of form may not be obtained any more, the precision member may be damaged and may not operate properly, or so.

SUMMARY OF THE INVENTION

According to an embodiment of the present invention, a packaging member includes a cushioning member that holds a holding part of a to-be-packaged member different from a predetermined part of the to-be-packaged member without coming into contact with the predetermined part of the to-be-packaged member. The cushioning member cushions a shock transmitted to the to-be-packaged member, and the packaging member packages the to-be-packaged member via the cushioning member.

Other objects, features and advantages of the present invention will become more apparent from the following detailed description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1**A shows a sectional view taken from cutting, by a cutting line E**1**-E**2** of FIG. **26**(*a*), a packaging box according to a configuration example 2 (according to an embodiment of the present invention) in which a toner container is packaged via cushioning members;

FIG. **1**B shows a sectional view taken from cutting, by a cutting line F**1**-F**2** of FIG. **26**(*a*), the packaging box according to the configuration example 2 in which the toner container is packaged via the cushioning members;

FIG. **2** shows a general configuration of an image forming apparatus according to embodiments of the present invention;

FIG. **3** is a sectional view showing an image forming part of the image forming apparatus shown in FIG. **2**;

FIG. **4** is a general view showing a toner supply path in the image forming apparatus shown in FIG. **2**;

FIG. **5** is a perspective view showing a toner container receiving part in a state where a toner container is installed;

FIG. **6** is a general perspective view showing the toner container in a state of being installed in the toner container receiving part;

FIG. **7** is a sectional view showing a head part of the toner container;

FIG. **8** is an exploded perspective view showing a holder of the toner container;

FIG. **9** is a perspective view showing a state where a body door is opened in the image forming apparatus;

FIG. **10**(*a*) shows a front view of a packaging box according to a configuration example 1 (according to an embodiment of the present invention), (*b*) shows a side view of the packaging box according to the configuration example 1, and (*c*) shows a plan view of the packaging box according to the configuration example 1;

FIG. **11** is a sectional view taken from cutting, by a cutting line A**1**-A**2** in FIG. **10**(*c*), the packaging box in which the toner container is not packaged;

FIG. **12** is a sectional view taken from cutting, by a cutting line B**1**-B**2** in FIG. **10**(*a*), the packaging box in which the toner container is not packaged;

FIG. **13** is a sectional view taken from cutting, by a cutting line C**1**-C**2** in FIG. **10**(*a*), the packaging box in which the toner container is not packaged;

FIG. **14** is a sectional view taken from cutting, by a cutting line A**3**-A**4** in FIG. **10**(*c*), the packaging box in which the toner container is not packaged;

FIG. **15** is a development of the packaging box with cushioning members function according to the configuration example 1;

FIG. **16** shows a perspective view of the packaging box after a bottom part is fabricated;

FIG. **17** is a sectional view taken from cutting, by a cutting line A**1**-A**2** in FIG. **10**(*c*), the packaging box in which the toner container is packaged;

FIG. **18** is a sectional view taken from cutting, by a cutting line B**1**-B**2** in FIG. **10**(*a*), the packaging box in which the toner container is packaged;

FIG. **19** is a sectional view taken from cutting, by a cutting line C**1**-C**2** in FIG. **10**(*a*), the packaging box in which the toner container is packaged;

FIG. **20** is a sectional view taken from cutting, by a cutting line A**3**-A**4** in FIG. **10**(*c*), the packaging box in which the toner container is packaged;

FIG. **21** shows the packaging box after fabrication is finished;

FIG. **22** illustrates an air layer part cushioning a shock in a state where the packaging box is dropped on corner "a":

FIG. **23** illustrates a part (corner), at which a cushioning member and another cushioning member intersect, cushioning a shock in a state where the packaging box is dropped on corner "b":

FIG. **24** is a sectional view taken from cutting, by a cutting line B**3**-B**4** in FIG. **10**(*c*), the packaging box according to the configuration example 1 in which the toner container is packaged;

FIG. **25** is a sectional view taken from cutting, in a direction perpendicular to the axial direction of the container body at the position of the container body, a packaging box in which the container body is sandwiched from the top and bottom directions by two cushioning members;

FIG. **26**(*a*) shows a front view of a packaging box according to the configuration example 2, (*b*) shows a side view of the packaging box according to the configuration example 2, and (*c*) shows a plan view of the packaging box according to the configuration example 2;

FIG. **27** is a sectional view taken from cutting, by a cutting line D**1**-D**2** in FIG. **26**(*c*), the packaging box in which cushioning members are contained and the toner container is not packaged;

FIG. **28** is a sectional view taken from cutting, by a cutting line D**3**-D**4** in FIG. **26**(*c*), the packaging box in which the cushioning members are contained and the toner container is not packaged;

FIG. **29**A shows a sectional view taken from cutting, by a cutting line E**1**-E**2** of FIG. **26**(*a*), the packaging box in which the cushioning members are contained and the toner container is not packaged;

FIG. **29**B shows a sectional view taken from cutting, by a cutting line F**1**-F**2** of FIG. **26**(*a*), the packaging box in which the cushioning members are contained and the toner container is not packaged;

FIG. **30** shows a development of the packaging box according to the configuration example 2;

FIG. **31** shows a development of the cushioning member according to the configuration example 2;

FIGS. **32** and **33** illustrate fabrication of the cushioning member;

FIG. **34** is a schematic diagram showing the cushioning member after fabrication is finished;

FIG. **35** shows a state where the container body of the toner container is placed on the cushioning member incorporated in the packaging box;

FIG. **36** shows a perspective view of a pad to be fitted between a bottle cap and an inner end face of the packaging box in an axial direction of the toner container;

FIG. **37** shows a development of the pad to be fitted between the bottle cap and the inner end face of the packaging box in the axial direction of the toner container;

FIG. **38** shows a state where the toner container is sandwiched by two cushioning members from the top and bottom directions in the inside of the packaging box;

FIG. **39** shows a sectional view taken from cutting, by a D**1**-D**2** line in FIG. **26**(*c*), the packaging box in which the toner container is packaged via the cushioning members;

FIG. **40** shows a sectional view taken from cutting, by a D**3**-D**4** line in FIG. **26**(*c*), the packaging box in which the toner container is packaged via the cushioning members;

FIG. **41** is a sectional view taken from cutting, in a direction perpendicular to the axial direction of the container body at the position of the container body, the packaging box in which the container body of the toner container is sandwiched from the top and bottom directions by four cushioning members having the same shapes;

FIG. **42**(*a*) shows a front view of a packaging box according to a configuration example 3 (according to an embodiment of the present invention), (*b*) shows a side view of the packaging box according to the configuration example 3, and (*c*) shows a plan view of the packaging box according to the configuration example 3;

FIG. **43** is a sectional view taken from cutting, by a cutting line G**1**-G**2** in FIG. **42**(*c*), the packaging box in which cushioning members are contained and the toner container is not packaged;

FIG. **44** is a sectional view taken from cutting, by a cutting line G**3**-G**4** in FIG. **42**(*c*), the packaging box in which the cushioning members are contained and the toner container is not packaged;

FIG. **45**A shows a sectional view taken from cutting, by a cutting line H**1**-H**2** of FIG. **42**(*a*), the packaging box in which the cushioning members are contained and the toner container is not packaged;

FIG. **45**B shows a sectional view taken from cutting, by a cutting line I**1**-I**2** of FIG. **42**(*a*), the packaging box in which the cushioning members are contained and the toner container is not packaged;

FIG. **46** shows a development of the cushioning member according to the configuration example 3;

FIGS. **47** and **48** illustrate fabrication of the cushioning member;

FIG. **49** is a schematic diagram showing the cushioning member after fabrication is finished;

FIG. **50** shows a state where the container body of the toner container is placed on the cushioning member incorporated in the packaging box;

FIG. **51** shows a perspective view of a U-shaped pad to be fitted to a gripping part provided at a rear end part of the container body;

FIG. **52** shows a state where the U-shaped pad to be fitted to the gripping part provided at the rear end part of the container body is fitted;

FIG. **53** shows a development of the U-shaped pad to be fitted to the gripping part provided at the rear end part of the container body;

FIG. **54** shows a state where the toner container is sandwiched by two cushioning members from the top and bottom directions in the inside of the packaging box;

FIG. **55** shows a sectional view taken from cutting, by a G**1**-G**2** line in FIG. **42**(*c*), the packaging box in which the toner container is packaged via the cushioning members;

FIG. **56** shows a sectional view taken from cutting, by a G**3**-G**4** line in FIG. **42**(*c*), the packaging box in which the toner container is packaged via the cushioning members;

FIG. **57**A shows a sectional view taken from cutting, by a cutting line H**1**-H**2** of FIG. **42**(*a*), the packaging box in which the toner container is packaged via the cushioning members;

FIG. **57**B shows a sectional view taken from cutting, by a cutting line I**1**-I**2** of FIG. **42**(*a*), the packaging box in which the toner container is packaged via the cushioning members;

FIG. **58** shows a development of a cushioning member according to a variant embodiment of the present invention;

FIG. **59**A shows a sectional view taken from cutting, by a cutting line H**1**-H**2** of FIG. **42**(*a*), the packaging box in which the toner container is packaged via the cushioning members according to the variant embodiment; and

FIG. **59**B shows a sectional view taken from cutting, by a cutting line I**1**-I**2** of FIG. **42**(*a*), the packaging box in which the toner container is packaged via the cushioning members according to the variant embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

In consideration of the above-mentioned problems, an object of embodiments of the present invention is to provide a packaging member and a packaging method by which it is possible to prevent or reduce a shock from directly transmitting to a predetermined part of a to-be-packaged member contained in the packaging member.

According to an embodiment of the present invention, a packaging member includes a cushioning member that holds a holding part of a to-be-packaged member different from a predetermined part of the to-be-packaged member without coming into contact with the predetermined part of the to-be-packaged member. The cushioning member cushions a shock transmitted to the to-be-packaged member, and the packaging member packages the to-be-packaged member via the cushioning member.

In the packaging member a space may be provided, for preventing a most projecting part of the predetermined part of the to-be-packaged member from coming into contact with a wall surface of the packaging member, between the most projecting part of the to-be-packaged member and the wall surface of the packaging member.

The cushioning member may be a hollow member, and the holding part of the to-be-packaged member may be held by the cushioning member in such a manner that a space may be provided between the holding part of the to-be-packaging part and a wall of the packaging member.

The cushioning member may have a rectangular shape to contain the holding part of the to-be-packaged member by four plate-shaped members, and ridge lines on which adjacent segments of the four plate-shaped members intersect. The cushioning member may be in contact with four wall surfaces, i.e., top, bottom and both side faces of the packaging member, respectively.

The ridge lines on which the adjacent segments of the four plate-shaped members intersect, may be approximately at the centers of the four wall surfaces of the top, bottom and both side faces of the packaging member, respectively.

The to-be-packaged member may be a receiving container comprising a container body as the holding part having a containing part that contains the contents and a content outlet; a cap member as the predetermined part to be fitted to the container body to cover the content outlet; and a sealing member to be inserted between the container body and the cap member. The cushioning member may be used to hold the container body in such a manner that the cap member and the cushioning member does not come into contact with one another.

A packaging method according to an embodiment of the present invention is a method of containing and packaging a to-be-packaged member in the inside of a packaging member via a cushioning member. In the packaging method, the cushioning member holds a holding part of the to-be-packaged member; and the to-be-packaged member is contained in the inside of the packaging member in a state where a predetermined part different from the holding part of the to-be-packaged member is suspended in the space inside of the packaging member.

In a case where the to-be-packaged member is a long member, the predetermined part of the to-be-packaged member corresponds to, for example, an end part of a long face, and the holding part corresponds to another part of the long face. In this case, the most projecting part of the predetermined part corresponds to, for example, an end face or a short face of the long member.

According to the embodiment of the present invention, only the holding part of the to-be-packaged member is held by the cushioning member, and the predetermined part of the to-be-packaged member is suspended in the space without coming into contact with the cushioning member. Thereby, even when a shock is given to the packaging member from the outside, it is possible to prevent the shock from directly transmitting from the cushioning member or the packaging member to the predetermined part of the to-be-packaged member.

Therefore, since the shock does not directly transmit to, for example, as in the case the predetermined part, a place where high accuracy of form is required or a place where a precision member such as an electronic part is installed in the to-be-packaged member, it is possible to avoid a problematic situation in which the shape is changed and high accuracy of form can no longer be obtained or in which the precision member is damaged and no longer operates properly.

Further, in another case where the to-be-packaged member is a powder receiving container including a container body as the holding part having a powder containing part containing powder such as toner and a powder outlet; a cap member as the predetermined part to be fitted to the container body to cover the powder outlet; and a sealing member to be inserted between the container body and the cap member, the cushioning member may be used to hold only the container body so that a state is created where the cap member is suspended in the space inside the packaging member without coming into contact with the cushioning member. Thereby, even when a shock is given to the packaging member from the outside, it is possible to prevent the shock from directly transmitting from the cushioning member or the packaging member to the predetermined part of the to-be-packaged member. Therefore, it is possible to prevent such a force that an axial line of the cap member is inclined from the axial line of the container body, from being applied to the cap member. Therefore, it is possible to avoid a situation in which the sealing member inserted between the container body and the cap member is shifted, a gap is created between the container body and the cap member, and the powder leaks through the gap to the outside.

Thus, according to the embodiments of the present invention, it is possible to prevent a shock from directly transmitting to the predetermined part of the to-be-packaged member contained in the inside of the packaging member.

Below, the embodiments of the present invention will be described using figures. It is noted that the same reference

numerals are given to the same or corresponding parts, and description thereof are simplified or omitted as it is appropriate.

First, using FIGS. **2** through **5**, a configuration and operations of the entirety of an image forming apparatus according to the embodiments will be described.

FIG. **2** shows an entire configuration of a printer as the image forming apparatus, FIG. **3** shows an enlarged view of an image forming part of the printer, FIG. **4** is a general view showing a toner supply path in the image forming part, and FIG. **5** is a perspective view showing a part of the toner supply path.

As shown in FIG. **2**, in a toner container receiving part **31** at a top part of the image forming apparatus body **100**, four toner containers **32**Y, **32**M, **32**C and **30**K corresponding to respective colors of yellow (Y), magenta (M), cyan (C) and black (K) are detachably (in a replaceable manner) installed.

Below the toner container receiving part **31**, an intermediate transfer unit **15** is disposed. Image forming parts **6**Y, **6**M, **6**C and **6**K corresponding to the respective colors of yellow (Y), magenta (M), cyan (C) and black (K) are disposed in parallel to face an intermediate transfer belt **8** of the intermediate transfer unit **15**.

As shown in FIG. **3**, the image forming part **6**Y corresponding to yellow includes a photosensitive drum **1**Y, and an electrification part **4**Y, a development unit **5**Y (development part), a cleaning part **2**Y and an electricity removal part (not shown) disposed around the photosensitive drum **1**Y. On the photosensitive drum **1**Y, an image forming process (including an electrification process; an exposure process; a development process; a transfer process; and a cleaning process) is carried out, and a yellow image is formed on the photosensitive drum **1**Y.

It is noted that the other three image forming parts **6**M, **6**C and **6**K have approximately the same configuration as that of the image forming part **6**Y corresponding to yellow except that the color of toner is different, and images corresponding to the respective toner colors are formed.

Below, description of the other three image forming parts **6**M, **6**C and **6**K is omitted as it is appropriate, and description of only the image forming part **6**Y corresponding to yellow will be described.

As shown in FIG. **3**, the photosensitive drum **1**Y is rotated clockwise by a driving motor (not shown). At the position of the electrification part **4**Y, a part of the surface of the photosensitive drum **1**Y is uniformly electrified (the electrification process).

After that, the part of the surface of the photosensitive drum **1**Y reaches an illumination position where laser light L emitted by an exposure unit **7** (see FIG. **2**) is illuminated, and an electrostatic latent image corresponding to yellow is formed there through an exposure scanning operation (the exposure process).

After that, the part of the surface of the photosensitive drum **1**Y reaches a position of facing the development unit **5**Y, the electrostatic latent image is developed there, and a toner image of yellow is formed (the development process).

After that, the part of the surface of the photosensitive drum **1**Y reaches a position of facing the intermediate transfer belt **8** and a primary transfer bias roller **9**Y, and the toner image on the photosensitive drum **1**Y is transferred to the intermediate transfer belt **8** (a primary transfer process). At this time, on the photosensitive drum **1**Y, not-yet-transferred toner slightly remains.

After that, the position of the surface of the photosensitive drum **1**Y reaches a position facing the cleaning part **2**Y, and there, the not-yet-transferred toner slightly remaining on the photosensitive drum **1**Y, is mechanically collected by a cleaning blade **2***a* (the cleaning process).

Finally, the part of the surface of the photosensitive drum **1**Y reaches a position facing the electricity removal part (not shown), and there, the residual electric potential on the photosensitive drum **1**Y is removed.

Thus, a series of image forming process carried out on the photosensitive drum **1**Y is finished.

It is noted that the above-described image forming process is carried out also in the other image forming parts **6**M, **6**C and **6**K in the same way.

After that, toner images of the respective colors formed on the respective photosensitive drums through the development processes are transferred onto the intermediate transfer belt **8** in a manner that they are superposed on each other. Thus, on the intermediate transfer belt **8**, a color image is formed.

As shown in FIG. **2**, the intermediate transfer unit **15** includes the intermediate transfer belt **8**, the four primary bias rollers **9**Y, **9**M, **9**C and **9**K, a secondary transfer backup roller **12**, a cleaning backup roller **13**, a tension roller **14** and an intermediate transfer cleaning part **10**. The intermediate transfer belt **8** is wound on and is supported by, the secondary backup roller **12**, the cleaning backup roller **13** and the tension roller **14**, and is moved in an endless manner in a direction of an arrow AR**1** in FIG. **2** as being driven and rotated by the secondary transfer backup roller **12**.

The four primary transfer rollers **9**Y, **9**M, **9**C and **9**K form primary transfer nips, respectively, as a result of sandwiching the intermediate transfer belt **8** between the four primary transfer rollers **9**Y, **9**M, **9**C and **9**K and the photosensitive drums **1**Y, **1**M, **1**C and **1**K, respectively. Then, transfer biases that are reverse the polarities of the toners are applied to the primary transfer rollers **9**Y, **9**M, **9**C and **9**K, respectively.

Then, the intermediate transfer belt **8** runs in the direction of the arrow AR**1**, and a part of the intermediate transfer belt **8** passes through the primary transfer nips of the respective primary transfer rollers **9**Y, **9**M, **9**C and **9**K, one by one, in sequence. Thus, the toner images of the respective colors on the photosensitive drums **1**Y, **1**M, **1**C and **1**K are primarily transferred to the intermediate transfer belt **8** in a manner that they are superposed with each other.

After that, the part of the intermediate transfer belt **8** on which the toner images of the respective colors have already been transferred and superposed reaches the position facing a secondary transfer roller **19**. At this position, a secondary transfer nip is formed as a result of the secondary transfer backup roller **12** and the secondary transfer roller **19** sandwiching the intermediate transfer belt **8**. Then, the toner image of the four colors formed on the intermediate transfer belt **8** is transferred to a to-be-transferred-to member P such as a transfer sheet of paper conveyed to the position of the secondary transfer nip. At this time, on the intermediate transfer belt **8**, not-yet-transferred toner not having been transferred to the to-be-transferred-to member P remains.

After that, the part of the intermediate transfer belt **8** reaches the position of the intermediate transfer cleaning part **10**. Then, at this position, the not-yet-transferred toner on the intermediate transfer belt **8** is collected.

Thus, a series or transfer processes carried out on the intermediate transfer belt **8** is finished.

It is noted that the to-be-transferred-to member P conveyed to the position of the secondary transfer nip is one conveyed from a paper supply part **26** disposed at a bottom part of the image forming apparatus body **100**, via a paper supply roller **27** and a registration roller pair **28**.

After that, the to-be-transferred-to member P to which the color image has been transferred at the position of the sec-

ondary transfer nip is conveyed to the position of a fixing part **20**. Then, at this position, by means of heat and pressure given by a fixing roller and a pressing roller, the color image transferred to the surface of the to-be-transferred-to member P is fixed to the to-be-transferred-to member P.

After that, the to-be-transferred-to member P passes through between rollers of a paper ejection roller pair **29**, and is ejected to the outside of the apparatus. The to-be-transferred-to member P thus ejected to the outside of the apparatus by the paper ejection roller pair **29** is stacked onto a stack part **30** as an output image, in sequence.

Thus, a series of image forming processes in the image forming apparatus is finished.

Next, using FIG. **3**, a configuration and operations of the development unit in the image forming part will be described in more detail.

The development unit **5**Y includes a development roller **51**Y facing the photosensitive drum **1**Y, a doctor blade **52**Y facing the development roller **51**Y, two conveyance screws **55**Y disposed in developer containing parts **53**Y, **54**Y and a concentration detection sensor **56**Y detecting toner concentration in the developer. The development roller **51**Y includes a magnet fixed in the inside and a sleeve rotating around the magnet. In the developer containing parts **53**Y, **54**Y, the binary developer G including carrier and toner is contained. The developer containing part **54**Y communicates with a toner conveyance pipe **43**Y via an opening formed at a top part of the developer containing part **54**Y.

The development unit **5**Y configured as described above operates as follows:

The sleeve of the development roller **51**Y is rotated in a direction of an arrow AR**2** in FIG. **3**. Then, the binary developer G carried on the development roller **51**Y by means of a magnetic field generated by the magnet moves on the development roller **51**Y as the sleeve is rotated.

It is noted that the ratio of the toner (toner concentration) in the developer is adjusted to fall within a predetermined range. In detail, in response to toner consumption in the development unit **5**Y, the toner contained in the toner container **32**Y is supplied to the developer containing part **54**Y via a toner supply unit **59** (see FIG. **4**).

After that, the toner supplied to the developer containing part **54**Y is mixed and stirred together with the binary developer G by the two conveyance screws **55**Y, and is circulated in the two developer containing parts **53**Y and **54**Y (including movements in directions perpendicular to FIG. **3**). Then, the toner in the binary developer G is attracted by the carrier by means of frictional electrification between the toner and the carrier, and is carried on the development roller **51**Y together with the carrier by means of magnetic force created on the development roller **51**Y.

The binary developer G carried on the development roller **51**Y is conveyed in the direction of the arrow AR**2**, and reaches a position of the doctor blade **52**Y. Then, after the amount of the binary developer G on the development roller **51**Y is controlled to be an appropriate amount, the binary developer G is conveyed to the position (development area) facing the photosensitive drum **1**Y. Then, by means of an electric field created at the development area, the toner is attracted by the latent image formed on the photosensitive drum **1**Y. After that, the binary developer G remaining on the development roller **51**Y reaches a position above the developer containing part **53**Y as the sleeve is rotated, and at this position, is removed from the development roller **51**Y.

Next, using FIG. **4**, the toner supply unit **59** introducing the toner contained in the toner container **32**Y into the development unit **5**Y will be described in detail.

It is noted that for the purpose of easy understanding, in FIG. **4**, the direction of the arrangement of the toner container **32**Y, the toner conveyance pipe **43**Y, a screw pump **60**, a nozzle **70**, a tube **71** and the development unit **5**Y is changed. Actually, in FIG. **4** a part of the toner supply path including the toner conveyance pipe **43**Y, the screw pump **60**, the nozzle **70** and the tube **71**, and, the longitudinal direction of the toner container **32**Y, are perpendicular to FIG. **4** (see FIG. **2**).

As shown in FIGS. **5** and **9**, the toners in the respective toner containers **32**Y, **32**M, **32**C and **32**K installed in the toner container receiving part **31** of the image forming apparatus body **100** are supplied to the respective development units appropriately through the toner supply paths provided for the respective toner colors, in response to toner consumptions in the development units of the respective colors. The four toner supply paths have approximately the same structures except that the colors of the toners used in the image forming processes are different.

In detail, as shown in FIG. **4**, when the toner container **32**Y is set in the toner container receiving part **31** of the image forming apparatus body **100**, the nozzle **70** of the toner container receiving part **31** is connected to the bottle cap **34**Y of the toner container **32**Y. At this time, a plugging member (opening/closing member) **34***d* of the toner container **32**Y opens a toner outlet of the bottle cap **34**Y in a state of being inserted between a claw member **76** pressed by a leaf spring **77** and the nozzle **70**. Thereby, the toner contained in a container body **33**Y of the toner container **32**Y is conveyed into the nozzle **70** via the toner outlet.

On the other hand, the other end of the nozzle **70** is connected to one end of the tube **71** as a conveyance pipe. The tube **71** is made of a flexible material excellent at toner resistance, and the other end thereof is connected to the screw pump **60** (Mohno Pump) of the toner supply unit.

The screw pump **60** is a suction-type single-axis eccentric screw pump, and includes a rotor **61**, a stator **62**, a suction port **63**, a universal joint **64** and a motor **66**. The rotor **61**, the stator **62** and the universal joint **64** are contained in a case (not shown). The stator **62** is a female screw like member made of an elastic material such as a rubber, and a helical groove of double pitch is formed on the inner surface. The rotor **61** is a male screw like member made of a rigid material such as a metal having an axis which is twisted spirally, and is inserted into the stator rotatably. One end of the rotor **61** is connected to the motor **66** via the universal joint **64**.

In the screw pump **60** configured as described above, the rotor **61** in the stator **62** is driven and rotated in a predetermined direction (counterclockwise viewed from the upstream side of the toner conveyance direction), and thereby, a suction force is created at a suction port **63** (negative pressure is created in the tube **71** as a result of air being suctioned from the tube **71**). Thereby, the toner in the toner container **32**Y is suctioned to the suction port **63** via the tube **71** together with air. The toner thus suctioned to the suction port **63** is supplied to the space between the stator **62** and the rotor **61**, and is supplied to the other end as the rotor **61** is rotated. The supplied toner is ejected from a supply outlet **67** of the screw pump **60**, and is supplied into the development unit **5**Y via the toner conveyance pipe **43**Y (a movement in a direction of arrows AR**3**).

Next, using FIGS. **6** and **7**, the toner container will be described.

As described above using FIGS. **2** and **5**, the four approximately cylindrical toner containers **32**Y, **32**M, **32**C and **32**K (toner bottles) are detachably installed in the toner container receiving part **31**. The toner containers **32**Y, **32**M, **32**C and **32**K are replaced by new ones when they have come to the end

of their lives, i.e., almost all of the contained toners have been consumed, for example. The toners of the respective colors contained in the toner containers **32**Y, **32**M, **32**C and **32**K are supplied to the development units of the respective image forming parts **6**Y, **6**M, **6**C and **6**K through the toner supply paths described above using FIG. **4** as is necessary.

FIG. **6** is a general perspective view showing the toner container **32**Y. FIG. **7** is a sectional view showing a side of a head part (i.e., a part at which the bottle cap **34**Y is installed) of the toner container **32**Y.

It is noted that the other three toner containers **32**M, **32**C and **32**K have approximately the same configuration as that of the toner container **32**Y except that the colors of the contained toners are different and the positions of a depression part **34***m* and a projection part **34***n* are different. Below, description of the other three toner containers **32**M, **32**C and **32**K will be omitted as it is appropriate, and only the toner container **32**Y containing the yellow toner will be described.

As shown in FIG. **6**, the toner container **32**Y includes mainly the container body **33**Y containing the toner and the bottle cap **34**Y provided at the head part of the container body **33**Y.

At the head part of the container body **33**Y, a gear part **33***c* which is rotated together with the container body **33**Y integrally and an opening A are provided (see FIG. **7**). The opening A is provided at the head part (i.e., the front position when the toner container **32**Y is loaded) of the container body **33**Y, and is used to eject the toner contained in the container body **33**Y toward a space (hollow) in the bottle cap **34**Y.

The gear part **33***c* (gear) engages with a driving gear **31***g* of a driving part provided to the toner container receiving part **31** of the image forming apparatus body **100**, transmits a rotation driving force to the container body **33**Y, and drives and rotates the container body **33**Y about a rotation axis. In detail, a part of the gear part **33***c* is exposed through a cut out part **34***h* formed on the bottle cap **34**Y, and engages with the driving gear **31***g* of the image forming apparatus body **100**. Then, the rotation driving force is transmitted from the driving gear **31***g* to the gear part **33***c*, and the container body **33**Y is rotated in a predetermined direction.

As shown in FIG. **6**, at a rear end part (bottom part) of the container body **33**Y, a gripping part **33***d* used by the user to grip when the user loads or removes the toner container **32**Y is provided.

Further, on an inner circumferential surface of the container body **33**Y, a spiral projection **33***b* is provided (appearing as a spiral groove when viewed from the outer circumferential side). The spiral projection **33***b* is used for ejecting the toner through the opening A by driving and rotating the toner container **33**Y in the predetermined direction. The container body **33**Y configured as described above may be produced by means of blow molding (except for the gear part **33***c*).

It is noted that in the toner container **32**Y, a stirring member **33***f* which is rotated together with the container body **33**Y is installed in the opening A. The stirring member **33***f* is a rod-shaped member that extends toward the inside of the container body **33**Y from the space in the inside of the bottle cap **34**Y, and is disposed obliquely with respect to the rotation axis of the container body **33**Y. As a result of the stirring member **33***f* being rotated together with the container body **33**Y, the performance of ejecting the toner from the opening A is improved.

Further, according to the embodiments, the container body **33**Y of the toner container **32**Y is rotated counterclockwise viewed from the upstream side of the toner conveyance direction. Further, the spiral direction (winding direction) of the spiral projection **33***b* in the container body **33**Y is set clockwise. Thereby, as a result of the rotation of the container body **33**Y, a vortex air flow of the clockwise direction the same as the rotation direction of created in the screw pump **60** is created in the toner container **32**Y.

As shown in FIGS. **6** and **7**, in the bottle cap **34**Y, a holder **34***c*, the plugging member **34***d* (shutter) as the opening/closing member, packing **34***e* and an IC chip **35** as an electronic part are installed. Further, as shown in FIG. **6**, on both side faces of the bottle cap **34**Y, engagement parts **34***g* (grooves) which the positioning members **31***c* of the toner container receiving part **31** engage with are provided. Further, on an end face of the bottle cap **34**Y, the depression part **34***m* into which a fitting member **31***d* of the toner container receiving part **31** is fitted is provided. Further, on a circumferential surface of the bottle cap **34**Y, the projection part **34***n* is provided which another fitting member (not shown) of the toner container receiving part **31** is fitted to. Further, the cut out part **34***h* through which the part of the gear part **33***c* is exposed is provided at a top part of the bottle cap **34**Y.

The bottle cap **34**Y communicates with the container body **33**Y through the opening A and ejects the toner from the opening A, through the toner outlet B (see FIG. **7**).

It is noted that according to the embodiments, the space (hollow) formed in the inside of the bottle cap **34** has an approximately cylindrical shape. Further, a toner ejection path (vertical path) from the cylindrical space formed in the inside of the bottle cap **34**Y to the toner outlet B has a conical shape. Thereby, the vortex air flow created in the inside of the container body **33**Y through the rotation of the container body **33**Y is maintained without disappearing, and is transferred toward the toner outlet B efficiently. Therefore, conveyance performance of the toner ejected from the toner outlet B and moving through the tube **71** is improved.

The bottle cap **34**Y is not rotated together with the rotation of the container body **33**Y, and is held by a holding part **73** of the toner container receiving part **31** without being rotated in a state where the engagement parts **34***g* engage with the positioning members **31***c*.

A claw **34***b***1** is provided to the bottle cap **34**Y (see FIG. **7**), and as a result of the claw **34***b***1** engaging with an engagement member formed at the head part of the container body **33**Y (the gear part **33***c*), the container body **33**Y is held rotatably with respect to the bottle cap **34**Y relatively. It is noted that in order that the rotation driving of the container body **33**Y is carried out smoothly, the claw **34***b***1** of the bottle cap **34**Y and the engagement member of the container body **33**Y engage with one another with an adequate clearance provided therebetween.

Further, at a bottom part of the bottle cap **34**Y, the holder **34***c* is provided. In the holder **34***c*, the plugging member **34***d* (shutter) acts as the opening/closing member, opening and closing the toner outlet B in response to an operation of loading or removing the toner container **32**Y, is installed. In more detail, as shown in FIGS. **7** and **8**, the detachable holder **34***c* installed to the bottle cap **34**Y includes a holder main part **34***c***10**, a holder cover **341**, the plugging member **34***d*, and a compression spring **340** as a pressing member. In the holder main part **34***c***10**, the toner outlet, and a through hole, communicating with the toner outlet and to which the nozzle **70** is inserted, are formed. The plugging member **34***d* is inserted into the through hole. Further, in a state where the compression spring **340** is inserted from the rear part of the plugging member **34***d*, the holder main part **34***c***10**, the plugging member **34***d* and the compression spring **340** are held to the bottle cap **34**Y by means of the holder cover **341**. The holder main part **34***c***10** is installed to the bottle cap **34**Y via an O-ring **342**,

and thereby, it is possible to prevent the toner from scattering from the outer circumferential surface of the holder main part **34***c***10**.

As shown in FIG. **7**, in the plugging member **34***d*, a blind hole is formed to guide a part of the compression spring **340**. Thereby, buckling of the compression spring **340** is avoided.

As described above, in the toner container **32**Y according to the embodiments, the compression spring **340** pressing the plugging member **34***d* in a direction of closing the toner outlet is installed. Therefore, the toner outlet is positively closed by the plugging member **34***d* even in a state where the toner container **32**Y exists alone without being installed in the image forming apparatus body **100**. Therefore, it is possible to positively prevent the toner from scattering.

Further, as shown in FIG. **7**, two sets of packing **370**, i.e., G-seal, and the like, as sealing members are provided in parallel in order to seal a space between the opposite surfaces of the container body **33**Y and the bottle cap **34**Y around the opening A in the toner container **32**Y according to the embodiments.

It is noted that the packing **370**, such as G-seal, is such that even when the container body **33**Y is assembled eccentrically or is driven and rotated eccentrically with respect to the bottle cap **34**Y, lip parts (rubber parts) are deformed to follow a movement of the container body **33**Y, and also, a permanent strain due to aging appears a little. Therefore, the sealing performance between the container body **33**Y and the bottle cap **34**Y is stably improved. Especially, according to the embodiments, since the plural sets of packing **370** are installed, the advantageous effect is further improved.

Below, operations of loading and removing (loading/removing operations) the toner container **32**Y into and from the toner container receiving part **31** will be simply described.

As shown in FIG. **9**, in a case where the toner container **32**Y is loaded into the toner container receiving part **31** of the image forming apparatus body **100**, first a body cover **110** provided on a front face of the image forming apparatus body **100** is opened, and the toner container receiving part **31** is exposed to the front side.

After that, the toner container **32**Y is pressed into the inside of the toner container receiving part **31**. That is, the toner container **32**Y is loaded into the toner container receiving part **31** along with the longitudinal direction of the container body **33**Y (toner container **32**Y) in such a manner that the bottle cap **34**Y is positioned at the front position with respect to the container body **33**Y.

At this time, while a first sliding part **34***c***1** (see FIG. **6**) is sliding on a slide fit surface of the toner container receiving part **31** at the front position of the toner container **32**Y, the toner container **32**Y is pressed into the inside of the toner container receiving part **31** by the user who grips the gripping part **33***d* at the rear end part of the toner container **32**Y, in a well-balanced manner,

After that, when the holder **34***c* of the toner container **32**Y reaches the holding part **73** of the toner container receiving part **31** (see FIG. **5**), positioning of the bottle cap **34**Y is started while in addition to the sliding operation of the first sliding part **34***c***1**, a second sliding part **34***c***2** is sliding on a slide fit surface (side surface). In more detail, engagement between the engagement parts **34***g* of the bottle cap **34**Y and the positioning members **31***c* of the toner container receiving part **31** is started. At this time, by means of an arm pair (not shown), the bottle cap **34**Y of the toner container **32**Y is pressed toward the holding part **73**.

Further, at this time, the claw member **76** (see FIGS. **4** and **6**) installed at the holding part **73** of the toner container receiving part **31** is rotated about a rotation shaft **76***a* to retreat to a position to avoid obstructing the loading of the bottle cap **34**Y. That is, the claw member **76** is pressed downward in a direction to move against the pressing force of the leaf spring **77** by means of the first sliding part **34***c***1**.

After that, when the operation to load the toner container **32**Y is further proceeded with, opening of the toner outlet B is started by the plugging member **34***d* in a state where the engagement parts **34***g* and the positioning members **31***c* engage with each other. That is, along with the front end of the nozzle **70** being inserted into a hole of the holder **34***c* (see FIG. **4**), the plugging member **34***d* is pressed and moved by the nozzle **70**.

At this time, the claw member **76** is rotated about the rotation shaft **76***a*, and projects from the above-described retreating position to a position to engage with the plugging member **34***d*. That is, the claw member **76** becomes free from being pressed and moved by the first sliding part **34***c***1**, and is pressed upward to the default position by the pressing force of the leaf spring **77**.

At this time, the plugging member **34***d* is sandwiched by the nozzle **70** and the claw member **76** (see FIG. **4**), and is in a state where the position in the toner container receiving part **31** (the holding part **73**) is fixed. Then, when the toner container **32**Y is further moved in the loading direction from the state, the toner outlet B is opened in the state where the position of the plugging member **34***d* is fixed.

Then, the position of the bottle cap **34**Y is fixed at a position (abutting reference position) where the holder **34***c* comes into contact with the holding part **73**. Further, at the same time, the plugging member **34***d* completely opens the toner outlet B, and also, the driving gear **31***g* of the driving part of the toner container receiving part **31** engages with the gear part **33***c* of the toner container **32**Y (see FIG. **6**). Further, the IC chip **35** faces a communication circuit **74** at a position where radio communication can be carried out therebetween. Further, the depression part **34***m* and the projection part **34***n* for ensuring non-interchangeability of the toner container are fitted to the fitting members of the image forming apparatus body **100**. Then, the toner outlet B of the toner container **32**Y communicates with a toner supply port **70***a* of the nozzle **70**, and thus, the operations of loading the toner container **32**Y are completed.

On the other hand, in a case where the toner container **32**Y is removed from the toner container receiving part **31** of the image forming apparatus body **100**, operations are carried out in procedures reverse to those at the time of loading described above.

First, the in response to an operation of the toner container **32**Y being removed from the holding part **73** (removing operation), the plugging member **34***d* is pressed by the claw member **76** and the toner outlet B is closed, in a state where the position of the plugging member **34***d* in the holding part **73** is fixed by the nozzle **70** and the claw member **76**. At this time, an end face of the plugging member **34***d* is fitted to the fitting part formed in the bottle cap **34**Y, and the closing of the toner outlet B by the plugging member **34***d* is completed. After that, when the toner container **32**Y is further moved in the removing direction, the claw member **76** is moved to a position of not preventing the removal of the bottle cap **34**Y. Then, after the bottle cap **34**Y is completely removed, the claw member **76** becomes free from being pressed and moved by the first sliding part **32***c***1**, and is returned to the default position by the pressing force of the leaf spring **77**.

There is a likelihood that toner container **32** (i.e., any one of the toner containers **32**Y, **32**C, **32**M and **32**K) used in the image forming apparatus according to the embodiments is dropped in any direction (any position/attitude) during a pro-

cess of physical distribution, and therefore, the toner container **32** is contained in a box as a packaging member via a cushioning member(s) to hold the toner container **32**.

Below, a packaging box that is a packaging member by which it is possible to package the toner container **32** as a cylindrical toner bottle in the inside of the packaging box will be described.

Configuration Example 1

FIG. **10**(*a*) shows a front view of a packaging box **400** according to a configuration example 1 (according to an embodiment of the present invention) where a box and cushioning members are integrated into one piece. FIG. **10**(*b*) shows a side view of the packaging box **400**, and FIG. **10**(*c*) shows a plan view of the packaging box **400**.

Further, FIG. **11** is a sectional view taken from cutting, by a cutting line A**1**-A**2** in FIG. **10**(*c*), the packaging box **400** in which a toner container **32** is not packaged. FIG. **12** is a sectional view taken from cutting, by a cutting line B**1**-B**2** in FIG. **10**(*a*), the packaging box **400** in which the toner container **32** is not packaged. FIG. **13** is a sectional view taken from cutting, by a cutting line C**1**-C**2** in FIG. **10**(*a*), the packaging box **400** in which the toner container **32** is not packaged. FIG. **14** is a sectional view taken from cutting, by a cutting line A**3**-A**4** in FIG. **10**(*c*), the packaging box **400** in which the tone container **32** is not packaged.

A method of fabricating the packaging box **400** will now be described.

FIG. **15** is a development of the packaging box **400**. A material of the packaging box **400** used in the configuration example 1 is corrugated paper, and is so-called A-type corrugated paper. A material of the corrugated paper is (220/150/220) BF, and a shape shown in FIG. **15** is cut out. Then, the cut-out corrugated paper is cut along the bold solid lines to form cuts, and is folded to form creases along the alternate long and short dashed lines. It is noted that it is not necessary to be limited to the above-mentioned material of the corrugated paper, and instead, a sheet having elasticity such as a plastic corrugated paper, a pasteboard, a plastic sheet, a plastic foamed sheet and the like may be used, for example. In FIG. **15**, arrows indicate directions of folding.

When the packaging box **400** is formed by folding the corrugated paper, upper flaps **410**A and **410**B and lower flaps **410**C and **410**D are formed to side face parts **402**A and **402**B that are side face parts facing one another from among four side face parts, i.e., the side face part **402**A, an end face part **404**A, the side face part **402**B and an end face part **404**B. The upper flaps **410**A and **410**B form a top opening of the packaging box **400** and act as a top face and cushioning members. The lower flaps **410**C and **410**D form a bottom opening of the packaging box **400** and act as a bottom face and cushioning members. Further, an upper flap **411**A to be positioned outside of the upper flaps **410**A and **410**B and a lower flap **411**C to be positioned outside of the lower flaps **410**C and **410**D are formed to the end face part **404**A from among the end face parts **404**A and **404**B that are the other side face parts facing one another. Further, an upper flap **411**B to be positioned outside of the upper flaps **410**A and **410**B and a lower flap **411**D to be positioned outside of the lower flaps **410**C and **410**D are formed to the end face part **404**B.

Cuts are provided between the upper flaps **410**A, **410**B, lower flaps **410**C, **410**D and the upper flaps **411**A, **411**B, lower flaps **411**C, **411**D, and a tab for sticking **407**A is provided to the rear end of the end face part **404**B. The tab for sticking **407**A is used for connecting to a tab for sticking **407**B provided to the front end of the side face part **402**A, by bonding together by using an adhesive such as a paste, when the packaging box **400** is formed as a result of folding inside the four side face parts, i.e., the side face part **402**A, the end face part **404**A, the side face part **402**B and the end face part **404**B in sequence. It is noted that the alternate long and two short dashed line in FIG. **15** indicates a boundary between the side face part **402**A and the tab for sticking **407**B.

<Procedure 1>

First, the side face section of the packaging box **400** is formed by folding inside the side face part **402**A, end face part **404**A, side face part **402**B and end face part **404**B in sequence and bonding together the tag for sticking **407**A and tag for sticking **407**B using a paste.

<Procedure 2>

Next, in order to form a triangle by a bottom face part **403**A, a lower cushioning wall part **406**C and a lower cushioning wall support part **406**Cb of the lower flap **410**C, the bottom face part **403**A, lower cushioning wall part **406**C and lower cushioning wall support part **406**Cb are folded inside in a manner of a valley fold at creases A, B and C shown in FIG. **15**. Thus, a bottom part at one side of the packaging box **400** is formed by the lower flap **410**C. It is noted that it is preferable that the angle formed between the bottom face part **403**A and the lower cushioning wall part **406**C of the triangle formed by the bottom face part **403**A, the lower cushioning wall part **406**C and the lower cushioning wall support part **406**Cb is 45°.

<Procedure 3>

The same as the procedure 1 described above, in order to form a triangle by a bottom face part **403**B, a lower cushioning wall part **406**D and a lower cushioning wall support part **406**Db of the lower flap **410**D, the bottom face part **403**B, lower cushioning wall part **406**D and lower cushioning wall support part **406**Db are folded inside in a manner of a valley fold at creases D, E and F shown in FIG. **15**. Thus, a bottom part at the other side of the packaging box **400** is formed by the lower flap **410**D. It is noted that it is preferable that the angle formed between the bottom face part **403**B and the lower cushioning wall part **406**D of the triangle formed by the bottom face part **403**B, the lower cushioning wall part **406**D and the lower cushioning wall support part **406**Db is 45°.

<Procedure 4>

Then, a short flap **405**C and an insert part **409**C of the lower flap **411**C are folded inside, and the insert part **409**C is inserted into a cut **408**F of the lower flap **410**C and a cut **408**G of the lower flap **410**D, so that creases G and H shown in FIG. **15** of the lower flap **411**C are folded in a manner of a valley fold. Further, a short flap **405**D and an insert part **409**D of the lower flap **411**D are folded inside, and the insert part **409**D is inserted into a cut **408**E of the lower flap **410**C and a cut **408**H of the lower flap **410**D, so that creases I and J shown in FIG. **15** of the lower flap **411**D are folded in a manner of a valley fold. Thereby, the lower flaps **410**C and **410**D folded inside of the packaging box **400** as mentioned above are prevented from opening by the lower flaps **411**C and **411**D, and thus, fabrication of the bottom part of the packaging box **400** is completed. FIG. **16** shows a perspective view of the packaging box **400** where fabrication of the bottom part is completed.

<Procedure 5>

When the bottom part of the packaging box **400** has been thus completed, a toner container **32** is set in the inside of the packaging box **400** in such a manner that the container body **33** of the toner container **32** is placed on the respective faces of the lower cushioning wall parts **406**C and **406**D. At this time, the bottle cap **34** (i.e., the corresponding one of the bottle caps **34**Y, **34**C, **34**M and **34**K) of the toner container **32**

is positioned at a position of facing openings **406**Ca and **406**Da formed on the lower cushioning wall parts **406**C and **406**D, respectively, so that the bottle cap **34** is prevented from coming into contact with the lower cushioning wall parts **406**C and **406**D.

<Procedure 6>

Next, in order to form a triangle by a top face part **401**A, an upper cushioning wall part **406**A and an upper cushioning wall support part **406**Ab of the upper flap **410**A, the top face part **401**A, upper cushioning wall part **406**A and upper cushioning wall support part **406**Ab are folded inside in a manner of a valley fold at creases K, L and M shown in FIG. **15**. Thus, a top part of one side of the packaging box **400** is formed by the upper flap **410**A. It is noted that it is preferable that the angle formed between the top face part **401**A and the upper cushioning wall part **406**A of the triangle formed by the top face part **401**A, the upper cushioning wall part **406**A and the upper cushioning wall support part **406**Ab is 45°.

<Procedure 7>

The same as the procedure 6 described above, in order to form a triangle by a top face part **401**B, an upper cushioning wall part **406**B and an upper cushioning wall support part **406**Bb of the upper flap **410**B, the top face part **401**B, upper cushioning wall part **406**B and upper cushioning wall support part **406**Bb are folded inside in a manner of a valley fold at creases N, O and P shown in FIG. **15**. Thus, a top part at the other side of the packaging box **400** is formed by the upper flap **410**B. It is noted that it is preferable that the angle formed between the top face part **401**B and the upper cushioning wall part **406**B of the triangle formed by the top face part **401**B, the upper cushioning wall part **406**B and the upper cushioning wall support part **406**Bb is 45°.

<Procedure 8>

Then, a short flap **405**A and an insert part **409**A of the upper flap **411**A are folded inside, and the insert part **409**A is inserted into a cut **408**B of the upper flap **410**A and a cut **408**C of the upper flap **410**B, so that creases Q and R shown in FIG. **15** of the upper flap **411**A are folded in a manner of a valley fold. Further, a short flap **405**B and an insert part **409**B of the upper flap **411**B are folded inside, and the insert part **409**B is inserted into a cut **408**A of the upper flap **410**A and a cut **408**D of the upper flap **410**B, so that creases S and T shown in FIG. **15** of the upper flap **411**B are folded in a manner of a valley fold. Thereby, the upper flaps **410**A and **410**B folded inside of the packaging box **400** as mentioned above are prevented from opening by the upper flaps **411**A and **411**B, and thus, fabrication of the top face part of the packaging box **400** is completed.

It is noted that when the top face part of the packaging box **400** is fabricated, the same as the above-mentioned case of fabrication of the bottom part, the bottle cap **34** of the toner container **32** is positioned at a position of facing openings **406**Aa and **406**Ba formed on the upper cushioning wall parts **406**A and **406**B, respectively, so that the bottle cap **34** is prevented from coming into contact with the upper cushioning wall parts **406**A and **406**B.

By thus carrying out fabrication according to the above-described procedures, the packaging box **400** as a carton having a cushioning function is formed. In the configuration example 1, since the cushioning members and the packaging box **400** are formed in one piece as a result of the single sheet of corrugated paper being folded, it is possible to reduce the required number of parts/components.

FIG. **17** is a sectional view taken from cutting, by a cutting line A**1**-A**2** in FIG. **10**(*c*), the packaging box **400** in which the toner container **32** is packaged. FIG. **18** is a sectional view taken from cutting, by a cutting line B**1**-B**2** in FIG. **10**(*a*), the packaging box **400** in which the toner container **32** is packaged. FIG. **19** is a sectional view taken from cutting, by a cutting line C**1**-C**2** in FIG. **10**(*a*), the packaging box **400** in which the toner container **32** is packaged. It is noted that the alternate long and two short dashed lines in FIG. **19** are imaginary lines. FIG. **20** is a sectional view taken from cutting, by a cutting line A**3**-A**4** in FIG. **10**(*c*), the packaging box **400** in which the toner container **32** is packaged. As can be seen from FIGS. **17**, **18** and **20**, the container body **33** is in contact with the respective cushioning wall parts, and as can be seen from FIGS. **17**, **19** and **20**, the bottle cap **34** is not in contact with the respective cushioning wall parts.

By thus packaging the toner container **32** in the packaging box **400**, the bottle cap **34** is suspended in the space without coming into contact with any one of the upper cushioning wall parts **406**A, **406**B and the lower cushioning wall parts **406**C, **406**D. Therefore, even when a shock is given to the packaging box **400** from the outside, the shock does not directly transmit to the bottle cap **34** from the cushioning wall parts or the packaging box **400**. Thus, it is possible to prevent such a force that the axial line of the bottle cap **34** is inclined from the axial line of the container body **33** (i.e., the corresponding one of the container bodies **33**Y, **33**M, **33**C and **33**K) from being applied to the bottle cap **34**. Therefore, it is possible to avoid a situation in which the packing **370** as the sealing member inserted between the container body **33** and the bottle cap **34** is shifted, a gap is created between the container body **33** and the bottle cap **34**, and the toner leaks through the gap.

Further, as shown in FIG. **21**, in the packaging box **400** as the carton having the cushioning function, the upper cushioning wall parts **406**A, **406**B and the lower cushioning wall parts **406**C, **406**D form a rectangle to contain the container body **33** in the inside of the packaging box **400**. Further, the ridge lines on which the mutually adjacent ones of the upper cushioning wall parts **406**A, **406**B and the lower cushioning wall parts **406**C, **406**D intersect, respectively, are positioned at approximately the centers of the four wall surfaces that form the top and bottom faces and both side faces, respectively.

Therefore, when the toner container **32** is contained in the packaging box **400**, spaces are created between the above-mentioned ridge lines and the container body **33**. Therefore, even when a shock or such is given to the packaging box **400** from the outside during transportation, the shock transmitting to the container body **33** is reduced, and it is possible to prevent the toner container **32** from being damaged during transportation, or so

Further, when the packaging box **400** is dropped on corner "a" shown in FIG. **22**, the shock is cushioned as a result of the buckling of an air layer **470** enclosed by the upper cushioning wall part **406**A, the top face part **401**A and the side face part **402**B, and therefore, a shock given to the container body **33** in the packaging box **400** can be reduced.

Further, when the packaging box **400** is dropped on corner "b" shown in FIG. **23**, the shock is cushioned as a result of the buckling of an air layer part **471** enclosed by the lower cushioning wall parts **406**C, **406**D and the container body **33** being created and an intersection part (corner) formed between the lower cushioning wall parts **406**C and **406**D, and therefore, a shock given to the container body **33** in the packaging box **400** can be reduced.

Thus, even when a shock or such is given to the packaging box **400** from the outside during transportation, the shock transmitting to the container body **33** is reduced, and it is possible to prevent the toner container **32** from being damaged during transportation, or so.

FIG. **24** is a sectional view taken from cutting, by a cutting line B**3**-B**4** in FIG. **10**(*c*), the packaging box **400** according to the configuration example 1 in which the toner container **32** is packaged. FIG. **25** is a sectional view taken from cutting, in a direction perpendicular to the axial direction of the container body **33** at the position of the container body **33**, a packaging box **480** in which the container body **33** is sandwiched from the top and bottom directions by cushioning members **481** and **482**, as a comparison example.

In the packaging box **400** according to the configuration example 1, as shown in FIG. **24**, for example, the load of the toner container **32** is received by the two faces i.e., the lower cushioning wall parts **406**C and **406**D, and the load is distributed as indicated by arrows shown in FIG. **24**. Therefore, in comparison to the case of FIG. **25** where the load of the toner container **32** is received by only the single face, i.e., the cushioning member **481** from among the cushioning members **481** and **482** in the packaging box **480** as indicated by an arrow shown in FIG. **25**, it is possible to reduce the shock given to the packaging box **400** from the outside and reaching the toner container **32** in the packaging box **400** according to the configuration example 1.

<Experiment>

Based on JIS Z 0202 "Method of drop test for packaged freights", a drop test was carried out using a RICOH Pro toner C900. The RICOH Pro toner C900 has a total weight of 3 kg, and the corrugated paper was made of BF 220/150. The drop test was carried out in a manner of 1-corner, 3-ridge, 6-face free fall from 90 cm onto a concrete floor. Further, as a comparison example, a drop test was carried out in the same conditions for a case where a cushioning member was used for holding the rear end of the container body **33** and the bottle cap **34** of the toner container **32**, and the toner container **32** was contained in a packaging box. Results of these drop tests are shown below as Table 1:

TABLE 1

NUMBER OF TIMES OF DROP	PACKAGING BOX IN COMPARISON EXAMPLE	PACKAGING BOX IN CONFIGURATION EXAMPLE 1
1	○	○
2	○	○
3	○	○
4	○	○
5	Δ	○
6	Δ	○
7	Δ	○
8	Δ	○
9	X	○
10	X	○

(○: NO TONER LEAKAGE, Δ: SOME BUCKLING IN CUSHIONING MEMBER, X: SOME TONER LEAKAGE)

In the case where the toner container **32** was contained in the packaging box **400** according to the configuration example 1, no damage was discovered in the parts such as the container body **33**, the bottle cap **34** and so forth, and also no leakage of the toner from the toner container **32** was discovered. In contrast thereto, in the case where the toner container **32** was contained in the packaging box in the comparison example, a leakage of the toner from the toner container **32** was discovered.

Configuration Example 2

In a configuration example 2 according to an embodiment of the present invention, cushioning members and a packaging box are separate parts, and three parts are included, i.e., the two cushioning members that hold the container body of the toner container and cushion a shock transmitted to the container body, and the packaging box containing the cushioning members, are included.

FIG. **26** shows an external appearance of the packaging box **500** according to the configuration example 2. FIG. **26**(*a*) shows a front view of the packaging box **500**, FIG. **26**(*b*) shows a side view of the packaging box **500**, and FIG. **26**(*c*) shows a plan view of the packaging box **500**.

Further, FIG. **27** is a sectional view taken from cutting, by a cutting line D**1**-D**2** in FIG. **26**(*c*), the packaging box **500** in which the cushioning members **600** are contained and the toner container **32** is not packaged. FIG. **28** is a sectional view taken from cutting, by a cutting line D**3**-D**4** in FIG. **26**(*c*), the packaging box **500** in which the cushioning members **600** are contained and the toner container **33** is not packaged. FIG. **29**A shows a sectional view taken from cutting, by a cutting line E**1**-E**2** of FIG. **26**(*a*), the packaging box **500** in which the cushioning members **600** are contained and the toner container **32** is not packaged. FIG. **29**B shows a sectional view taken from cutting, by a cutting line F**1**-F**2** of FIG. **26**(*a*), the packaging box **500** in which the cushioning members **600** are contained and the toner container **32** is not packaged. It is noted that the alternate long and two short dashed lines in FIG. **29**A are imaginary lines.

FIG. **30** shows a development of the packaging box **500**, and the alternate long and short dashed lines in FIG. **30** show crease parts for creases. The packaging box **500** is formed as a result of a so-called A-type corrugated paper having a plate shape being folded. When the packaging box **500** is formed by folding this corrugated paper, outer upper flaps **503** and **504** and outer lower flaps **505** and **506** are formed to respective ones of side face parts **501** and **502** that are side face parts facing one another from among four side face parts, i.e., the side face part **501**, an end face part **507**, the side face part **502** and an end face part **508**. The outer upper flaps **503** and **504** close a top opening of the packaging box **500** and act as a top face. The outer lower flaps **505** and **506** close a bottom opening of the packaging box **500** and act as a bottom face. On the other hand, an inner upper flap **510** to be disposed inside of the outer upper flaps **503** and **504**, and an inner lower flap **511** to be disposed inside of the outer lower flaps **505** and **506** are formed to the end face part **507** from among the end face parts **507** and **508** that are the other side face parts facing one another. Further, an inner upper flap **512** to be disposed inside of the outer upper flaps **503** and **504**, and an inner lower flap **513** to be disposed inside of the outer lower flaps **505** and **506** are formed to the end face part **508**.

A tab for sticking **509** is provided to the rear end of the side face part **502**, and is used for connecting the rear end of the side face part **502** to the front end of the end face part **507** by bonding together by using an adhesive such as a paste when the packaging box **500** is formed as a result of folding inside the side face part **501**, the end face part **507**, the side face part **502** and the end face part **508** in sequence.

It is noted that fabrication of the packaging box **500** is carried out in such a manner that in order that the toner container **32** can be installed in the packaging box **500** from the top opening of the packaging box **500**, the inner lower flaps **511**, **513** are folded inside, thereafter the outer lower flaps **505** and **506** are folded inside, the bottom opening is thus closed, and thus the bottom of the packaging box **500** is formed. On the other hand, the outer upper flaps **503** and **504** and the inner upper flaps **510** and **512** are not folded, and a state where the top opening of the packaging box **500** is opened is maintained. Then, after the toner container **32** is contained into the packaging box **500** from the top opening,

the inner upper flaps **510** and **512** are folded inside, thereafter the outer flaps **503** and **504** are folded inside, thus the top opening of the packaging box **500** is closed, and thus the packaging box **500** is covered.

FIG. **31** is a development of the cushioning member **600**, and the alternate long and short dashed lines in FIG. **31** indicate crease parts for creases.

First, wall parts **601**, **602** and **603** are folded to the front side to stand up as one piece from wall parts **607** and **612** in such a manner that creases A', B' and C' are a valley fold and creases O' and P' are a mountain fold. Similarly, wall parts **604**, **605** and **606** are folded to the front side to stand up as one piece from wall parts **607** and **613** in such a manner that creases D', E' and F' are a valley fold and creases Q' and R' are a mountain fold. FIG. **32** shows a state of the cushioning member **600** obtained from these folding operations.

Next, wall parts **609** and **611** are folded in such a manner that creases G', K', M' and H' are a valley fold, a cut **600***a* of the wall part **611** is fitted to a fitting part **601***a* of the wall part **601**, a cut **600***b* of the wall part **611** is fitted to a fitting part **604***b* of the wall part **604**, and thus, a state shown in FIG. **33** is created. It is noted that it is preferable that the angle formed between the wall part **609** and the wall part **611** is 45°. Similarly, wall parts **608** and **610** are folded in such a manner that creases I', L', N' and J' are a valley fold, a cut **600***c* of the wall part **610** is fitted to a fitting part **601***c* of the wall part **601**, a cut **600***d* of the wall part **610** is fitted to a fitting part **604***d* of the wall part **604**, and thus, a state shown in FIG. **34** is created. It is noted that it is preferable that the angle formed between the wall part **608** and the wall part **610** is 45°.

The cushioning member **600** thus fabricated is incorporated into the packaging box **500** as shown in FIG. **35**, and the toner container **32** is set on the cushioning member **600** in the packaging box **500** in such a manner that the container body **33** of the toner container **32** is placed on the respective faces of the wall parts **610** and **611**.

Further, as shown in FIG. **35**, a pad **650** shown in FIG. **36** is fitted between the bottle cap **34** and the inner end face of the packaging box **500** in the axial direction of the toner container **32**, and thus, movements of the toner container **32** in the packaging box **500** are restricted. FIG. **37** is a development of the pad **650**, and the alternate long and short dashed lines indicate crease parts for creases. Fabrication of the pad **650** is carried out in such a manner that in order that prismatic parts having hollows are formed at both sides (see FIG. **36**), side wall parts **652**, **653**, **654** and **655** are folded to the side of a side wall **651** with creases Q', R', S' and T' being a valley fold, and further, side wall parts **656**, **657**, **658** and **659** are folded to the side of the side wall **651** with creases U', V', W' and X' being a valley fold. After these folding operations, the face of the side face part **655** and the face of the side face part **659** are bonded together by means of an adhesive such as a paste, and thus, the fabrication of the pad **650** is completed.

Then, on the toner container **32** thus having been set on the cushioning member **600** in the packaging box **500**, another cushioning member **600** is placed. Then, as shown in FIG. **38**, a state where the toner container **32** is sandwiched by the cushioning members **600** from the top and bottom directions in the packaging box **500** is created, the inner upper flaps **510**, **512** and the outer upper flaps **503**, **504** are closed, and thus, packaging is completed.

FIG. **39** shows a sectional view taken from cutting, by a D**1**-D**2** line in FIG. **26**(*c*), the packaging box **500** in which the toner container **32** is packaged via the cushioning members **600**. FIG. **40** shows a sectional view taken from cutting, by a D**3**-D**4** line in FIG. **26**(*c*), the packaging box **500** in which the toner container **32** is packaged via the cushioning members **600**. FIG. **1**A shows a sectional view taken from cutting, by a cutting line E**1**-E**2** of FIG. **26**(*a*), the packaging box **500** in which the toner container **32** is packaged via cushioning members **600**. FIG. **1**B shows a sectional view taken from cutting, by a cutting line F**1**-F**2** of FIG. **26**(*a*), the packaging box **500** in which the toner container **32** is packaged via the cushioning members **600**. It is noted that the alternate long and two short dashed lines in FIG. **1**A indicate imaginary lines.

As a result of the toner container **32** being packaged into the packaging box **500** via the cushioning members **600** as described above, the bottle cap **34** of the toner container **32** is suspended in the space without coming into contact with the cushioning members **600** as shown in FIG. **1**A. That is, as shown in FIG. **1**B, the toner container **32** is contained in the packaging box **500** in a state where only the container body **33** is held by the cushioning members **600**. Further, between the holder **34***c* of the bottle cap **34** which is a projection part most projecting and the inner wall surface of the packaging box **500**, a space is provided having a size such that even if a shock is given from the outside as a result of the packaging box **500** being dropped, the holder **34***c* of the bottle cap **34** is prevented from coming into contact with the inner wall surface of the packaging box **500** via the wall part **612** of the cushioning member **600**.

Thus, by packaging the toner container **32** in the packaging box **500**, the bottle cap **34** is suspended in the space without coming into contact with the cushioning members **600**. Therefore, even when a shock is given to the packaging box **500** from the outside, the shock does not directly transmit to the bottle cap **34** from the cushioning members **600** or the packaging box **500**. Therefore, it is possible to prevent such a force that the axial line of the bottle cap **34** is inclined from the axial line of the container body **33** from being applied to the bottle cap **34**. Therefore, it is possible to avoid a situation in which the sealing member inserted between the container body **33** and the bottle cap **34** is shifted, a gap is created between the container body **33** and the bottle cap **34**, and the toner leaks through the gap.

<Experiment>

Based on JIS Z 0202 "Method of drop test for packaged freights", a drop test was carried out where a RICOH Pro toner C900 as the toner container **32** was contained in the packaging box **500** via the cushioning members **600** according to the configuration example 2. The RICOH Pro toner C900 has a total weight of 3 kg, and the corrugated paper was made of BF 220/150. The drop test was carried out in a manner of 1-corner, 3-ridge, 6-face free fall from 90 cm onto a concrete floor. As a result of the experiment, no damage was discovered in the parts such as the container body **33**, the bottle cap **34** and so forth, and also no leakage of the toner from the toner container **32** was discovered.

FIG. **41** is a sectional view taken from cutting, by a F**1**-F**2** cutting line of FIG. **26**(*a*), the packaging box **500** in which four cushioning members **660** having the same shapes instead of the cushioning members **600** are contained and the container body **33** of the toner container **32** is sandwiched and held from the top and bottom directions by the cushioning members **660**.

In the configuration example 2, the cushioning members **600** are disposed separately into the two parts, i.e., the top part and the bottom part, in the packaging members **500**. However, instead, as shown in FIG. **41**, the cushioning members **660** which are separate from the packaging box **500** may be disposed separately into the four parts, i.e., the top right part, the top left part, the bottom right part and the bottom left part. Then, as a result of the toner container **32** being contained in

the packaging box **500** in a state where only the container body **33** of the toner container **32** is held by the cushioning members **660** and the bottle cap **34** is suspended in the space without coming into contact with the cushioning members **660**, the advantages of the above-described various effects can be obtained the same as those obtained in the case of using the cushioning members **600**.

Configuration Example 3

A configuration example 3 according to an embodiment of the present invention is another configuration example where a packaging box and cushioning members are separate from each other, the two cushioning members and the box containing the cushioning members are included, and thus, the three parts are included. The packaging box according to the configuration example 3 has the same as or similar to the packaging box **500** described above for the configuration example 2, and therefore, description of how to fabricate the packaging box **500**, and so forth, will be omitted.

FIG. **42**(*a*) shows a front view of the packaging box **500** according to the configuration example 3, FIG. **42**(*b*) shows a side view of the packaging box **500** according to the configuration example 3, and FIG. **42**(*c*) shows a plan view of the packaging box **500** according to the configuration example 3;

Further, FIG. **43** is a sectional view taken from cutting, by a cutting line G**1**-G**2** in FIG. **42**(*c*), the packaging box **500** in which the cushioning members **700** are contained and the toner container **32** is not packaged. FIG. **44** is a sectional view taken from cutting, by a cutting line G**3**-G**4** in FIG. **42**(*c*), the packaging box **500** in which the cushioning members **700** are contained and the toner container **32** is not packaged. FIG. **45**A shows a sectional view taken from cutting, by a cutting line H**1**-H**2** of FIG. **42**(*a*), the packaging box **500** in which the cushioning members **700** are contained and the toner container **32** is not packaged. FIG. **45**B shows a sectional view taken from cutting, by a cutting line I**1**-I**2** of FIG. **42**(*a*), the packaging box **500** in which the cushioning members **700** are contained and the toner container **32** is not packaged.

FIG. **46** shows a development of the cushioning member **700** according to the configuration example 3. The alternative long and short dashed lines indicate crease parts for creases.

First, wall parts **701**, **702** and **703** are folded to the front side to stand up as one piece from wall parts **707** and **712** in such a manner that creases A", B" and C" are a valley fold and creases O" and P" are a mountain fold. Similarly, wall parts **704**, **705** and **706** are folded to the front side to stand up as one piece from wall parts **707** and **713** in such a manner that creases D", E" and F" are a valley fold and creases Q" and R" are a mountain fold. FIG. **47** shows a state of the cushioning member **700** obtained from these folding operations.

Next, wall parts **709** and **711** are folded in such a manner that creases G", K", M" and H" are a valley fold, a cut **700***a* of the wall part **711** is fitted to a fitting part **701***a* of the wall part **701**, a cut **700***b* of the wall part **711** is fitted to a fitting part **704***b* of the wall part **704**, and thus, a state shown in FIG. **48** is created. It is noted that it is preferable that the angle formed between the wall part **709** and the wall part **711** is 45°. Similarly, wall parts **708** and **710** are folded in such a manner that creases I", L", N" and J" are a valley fold, a cut **700***c* of the wall part **710** is fitted to a fitting part **701***c* of the wall part **701**, a cut **700***d* of the wall part **710** is fitted to a fitting part **704***d* of the wall part **704**, further, an insert part **710***a* of the wall part **710** is inserted into an opening **711***a* of the wall part **711**, and thus, a state shown in FIG. **49** is created. It is noted that it is preferable that the angle formed between the wall part **708** and the wall part **710** is 45°.

The cushioning member **700** thus fabricated is incorporated into the packaging box **500** as shown in FIG. **50**, and the toner container **32** is set on the cushioning member **700** in the packaging box **500** in such a manner that the container body **33** of the toner container **32** is placed on the respective faces of the wall parts **710** and **711**. At this time, a pad **750** having a U-shape shown in FIG. **51** is fitted to the gripping part **33***d* provided at the rear end of the container body **33** of the toner container **32**, and as shown in FIG. **52**, movements of the toner container **32** in the axial directions in the packaging box **500** are restricted.

FIG. **53** shows a development of the pad **750**, and the alternate long and short dashed lines indicate crease parts for creases. The pad **750** is fabricated as a result of respective side wall parts are superposed together. That is, a crease R" is folded in a valley fold so that a side wall parts **751** and **752** are superposed together. Next, a crease S" is folded in a mountain fold so that the side wall parts **752** and **753** are superposed together. Next, a crease T" is folded in a valley fold so that the side wall parts **753** and **754** are superposed together. Next, a crease U" is folded in a mountain fold so that the side wall parts **754** and **755** are superposed together. Finally, a crease V" is folded so that the side wall parts **755** and **756** are superposed together. Thus, a valley fold and a mountain fold are repeated alternately and the folding operations are carried out so that the respective side wall parts are superposed together. Thus, the fabrication of the pad **750** is completed.

Then, on the toner container **32** having been thus set on the cushioning member **700** in the packaging box **500**, another cushioning member **700** is placed. Then, as shown in FIG. **54**, a state where the toner container **32** is sandwiched by the cushioning members **700** from the top and bottom directions in the packaging box **500** is created, the inner upper flaps **510**, **512** and the outer upper flaps **503**, **504** are closed, and thus, packaging is completed.

FIG. **55** shows a sectional view taken from cutting, by a G**1**-G**2** line in FIG. **42**(*c*), the packaging box **500** in which the toner container **32** is packaged via the cushioning members **700**. FIG. **56** shows a sectional view taken from cutting, by a G**3**-G**4** line in FIG. **42**(*c*), the packaging box **500** in which the toner container **32** is packaged via the cushioning members **700**. FIG. **57**A shows a sectional view taken from cutting, by a cutting line H**1**-H**2** of FIG. **42**(*a*), the packaging box **500** in which the toner container **32** is packaged via cushioning members **700**. FIG. **57**B shows a sectional view taken from cutting, by a cutting line I**1**-I**2** of FIG. **42**(*a*), the packaging box **500** in which the toner container **32** is packaged via the cushioning members **700**. It is noted that the alternate long and two short dashed lines in FIG. **57**A indicate imaginary lines.

As a result of the toner container **32** being packaged into the packaging box **500** via the cushioning members **700** as described above, the bottle cap **34** of the toner box **32** is in a state of suspended in the space without coming into contact with the cushioning members **700** as shown in FIG. **57**A. That is, as shown in FIG. **57**B, the toner container **32** is contained in the packaging box **500** in a state where only the container body **33** is held by the cushioning members **700**. Further, between the holder **34***c* of the bottle cap **34** which is a projection part most projecting and the inner wall surface of the packaging box **500**, a space is provided having a size such that even if a shock or such is given from the outside as a result of the packaging box **500** being dropped, the holder **34***c* of the bottle cap **34** is prevented from coming into contact with the inner wall surface of the packaging box **500** via the wall part **712** of the cushioning member **700**.

Since the bottle cap **34** is suspended in the space without coming into contact with the cushioning members **700**, even when a shock is given to the packaging box **500** from the outside, the shock does not directly transmit to the bottle cap **34** from the cushioning members **700** or the packaging box **500**. Therefore, it is possible to prevent such a force that the axial line of the bottle cap **34** is inclined from the axial line of the container body **33** from being applied to the bottle cap **34**. Therefore, it is possible to avoid a situation in which the packing **370** as the sealing member inserted between the container body **33** and the bottle cap **34** is shifted, a gap is created between the container body **33** and the bottle cap **34**, and the toner leaks through the gap.

Variant Embodiment

FIG. **58** shows a development of a cushioning member **700** according to a variant embodiment of the present invention. FIG. **59**A shows a sectional view taken from cutting, by a cutting line H**1**-H**2** of FIG. **42**(*a*), the packaging box **500** in which the toner container **32** is packaged via the cushioning members **700** according to the variant embodiment. FIG. **59**B shows a sectional view taken from cutting, by a cutting line I**1**-I**2** of FIG. **42**(*a*), the packaging box **500** in which the toner container **32** is packaged via the cushioning members **700** according to the variant embodiment. It is noted that the alternate long and two short dashed lines in FIG. **59**A indicate imaginary lines.

As the cushioning members **700** according to the variant embodiment, as shown in FIG. **58**, a standing up part **712***a* may be provided at the center on an end of the wall part **712** in a longitudinal direction of the cushioning member **700**, the standing up part **712** standing up as a result of a crease S" being fold in a valley fold. By thus providing the standing up part **712***a* to the wall part **712**, it is possible that the flaps **710** and **711** come into contact with both ends of the standing up part **712***a*, respectively, as shown in FIG. **59**A, and movements of the flaps **710** and **711** to approach the bottle cap **34** are restricted. By thus restricting the movements of the flaps **710** and **711** by the standing up part **712***a*, it is more possible to positively prevent the bottle cap **34** and the cushioning members **700** from coming into contact with one another. Therefore, it is more possible to positively prevent a shock from directly transmitting to the bottle cap **34** from the cushioning members **700**, and also, it is possible to avoid a situation in which the flaps **710**, **711** of the cushioning members **700** and the bottle cap **34** rub against each other and the flaps **710**, **711** of the cushioning members **700** and/or the bottle cap **34** are/is damaged.

<Experiment>

Based on JIS Z 0202 "Method of drop test for packaged freights", a RICOH Pro toner C900 as the toner container **32** was contained in the packaging box **500** via the cushioning members **700** according to the variant embodiment, and a drop test was carried out. The RICOH Pro toner C900 has a total weight of 3 kg, and the corrugated paper is made of BF 220/150. The drop test was carried out in a manner of 1-corner, 3-ridge, 6-face free fall from 90 cm, onto a concrete floor. As a result of the experiment, no damage was discovered in the parts such as the container body **33**, the bottle cap **34** and so forth, and also no leakage of the toner from the toner container **32** was discovered.

Thus, according to the embodiments of the present invention described above, in the packaging box **400** or **500** as a packaging member (hereinafter, simply referred to as a packaging box), a cushioning member(s) (i.e., the above-mentioned upper cushioning wall parts **406**A, **406**B, lower cushioning wall parts **406**C, **406**D, cushioning member **600** or **700**, or such) is provided which does not come into contact with the bottle cap **34**, which is a predetermined part of the toner container **32**, which is a to-be-packaged member, holds the container body **33**, which is a holding part different from the predetermined part of the toner container **32**, and cushions a shock transmitted to the toner container **32**. Thus, the toner container **32** is packaged in the inside of the packaging box via the cushioning member(s), and thereby, a state is created where the bottle cap **34** does not come into contact with the cushioning member(s), and is suspended in the space in the packaging box. Thereby, even when a shock is given to the packaging box from the outside, it is possible to prevent the shock from directly transmitting to the bottle cap **34** from the cushioning member(s) or the packaging box.

Further, according to the embodiments of the present invention, the space is provided between the holder **34***c* and the wall surface of the packaging box, such that the holder **34***c* of the bottle cap **34**, which is a projection part projecting the most, does not come into contact with the wall surface of the packaging box. Thereby, it is more possible to positively prevent such a force that the axial line of the bottle cap is inclined from the axial line of the container body from being given to the bottle cap.

Further, according to the embodiments of the present invention, the cushioning member(s) has a hollow, and as a result of the container body **33** is held in such a manner that the space is created between the container body **33** and the wall of the packaging box, a shock reaching the toner container **32** is reduced even when the shock is given to the packaging box from the outside, and thus it is possible to avoid a situation in which the toner container **32** is damaged or so.

Further, according to the embodiments of the present invention, the cushioning member(s) has a rectangular cavity formed to contain the container body **33** by the four plate-shaped members, and the ridge lines on which the adjacent ones of the four plate-shaped members intersect, respectively, are in contact with the four wall surfaces that are the top and bottom faces and both side faces of the packaging box, respectively. Thereby, the container body **33** is like suspended in the space via the spaces created between the ridge lines and the container body **33**. Thereby, a shock reaching the toner container **32** is reduced even when the shock is given to the packaging box from the outside, and thus it is possible to avoid a situation in which the toner container **32** is damaged or so.

Further, according to the embodiments of the present invention, the ridge lines on which the adjacent ones of the above-mentioned four plate-shaped members intersect, respectively, are positioned preferably at approximately the centers of the four wall surfaces that are the top and bottom faces and both side faces of the packaging box, respectively.

Further, according to the embodiments of the present invention, in a method of containing and packaging the toner container **32**, which is a powder receiving container including the cylindrical container body **33** and the bottle cap **34** as a cap member, via the cushioning member(s) in the inside of the packaging box, the cushioning member(s) holds the container body **33**; and the toner container **32** is contained in the inside of the packaging box in a state where the bottle cap **34** different from the container body **33** is suspended in the space inside of the packaging box. Thereby, even when a shock is given to the packaging box from the outside, it is possible to prevent such a force that the axial line of the bottle cap is inclined from the axial line of the container body from being given to the bottle cap. Therefore, it is possible to avoid a

situation in which the packing **370** inserted between the container body **33** and the bottle cap **34** is shifted, a gap is created between the container body **33** and the bottle cap **34**, and the toner as powder leaks through the gap.

Further, according to the embodiments of the present invention, the to-be-packaged member is the toner container **32** acting as a receiving container including the container body **33** as the holding part having the toner receiving part contains the toner and the opening A as the content outlet; the bottle cap **34** as the cap member as the predetermined part fitted to the container body **34** to cover the opening A; and the packing **370** as the sealing member inserted between the container body **33** and the cap member **34**. The cushioning member(s) holds the container body **33** in such a manner that the cap member **34** and the cushioning member(s) do not come into contact with one another. Thus, a state where only the container body **33** of the toner container **32** is held by the cushioning member(s) and the bottle cap **34** is suspended in the space without coming into contact with the cushioning member(s) is created. Thereby, even when a shock is given to the packaging box from the outside, it is possible to prevent such a force that the axial line of the bottle cap is inclined from the axial line of the container body from being given to the bottle cap. Therefore, it is possible to avoid a situation in which the packing **370** inserted between the container body **33** and the bottle cap **34** is shifted, a gap is created between the container body **33** and the bottle cap **34**, and the toner as powder leaks through the gap.

Further, according to the embodiments of the present invention, in a method of containing and packaging the toner container **32**, which is the to-be-packaged member, via the cushioning member(s) in the inside of the packaging box, the cushioning member(s) holds the container body **33** which is the holding member of the toner container **32**; and the toner container **32** is contained in the inside of the packaging box in a state where the bottle cap **34** that is the predetermined part different from the container body **33** of the toner container **32** is suspended in the space inside of the packaging box. Thereby, even when a shock is given to the packaging box from the outside, it is possible to prevent the shock from directly transmitting to the bottle cap **34** from the cushioning member(s) or the packaging box, and it is possible to prevent such a force that the axial line of the bottle cap is inclined from the axial line of the container body from being given to the bottle cap. Therefore, it is possible to avoid a situation in which the packing **370** inserted between the container body **33** and the bottle cap **34** is shifted, a gap is created between the container body **33** and the bottle cap **34**, and the toner as powder leaks through the gap.

It is noted that according to the embodiments of the present invention, as the to-be-packaged member, the toner container **32** is used. However, also in a case where the to-be-packaged member is other than the toner container **32**, it is possible to avoid a situation in which the shape is changed and high accuracy of form can no longer be obtained or in which a precision member no longer operates properly. This is because a shock does not directly transmit to the predetermined part, as a result of only a holding part of the to-be-packaged member being held by a cushioning member(s), and the to-be-packaged member being contained in the packaging box via the cushioning member(s) in a state where a predetermined part of the to-be-packaged member such as a part required to have high accuracy of form or a part at which the precision member such as an electronic part is installed is suspended in the space in the packaging box without coming into contact with the cushioning member(s).

The present invention is not limited to the specifically disclosed embodiments, and variations and modifications may be made without departing from the scope of the present invention.

The present application is based on Japanese Priority Patent Application No. 2010-274396, filed Dec. 9, 2010, the entire contents of which are hereby incorporated herein by reference.

What is claimed is:

1. A packaging member comprising:

a cushioning member configured to hold a holding part of a to-be-packaged member different from a predetermined part of the to-be-packaged member without coming into contact with the predetermined part of the to-be-packaged member; and

a wall member configured to stand in a standing direction from a bottom of the cushioning member, wherein

the cushioning member is configured to cushion a shock transmitting to the to-be-packaged member,

the packaging member packages the to-be-packaged member via the cushioning member,

the cushioning member is a hollow member and includes four flat members collectively bounding a hollow space,

the holding part of the to-be-packaged member is held by the cushioning member in such a manner that a space is provided between the holding part of the to-be-packaged member and a wall of the packaging member,

the cushioning member has a rectangular shape containing the holding part of the to-be-packaged member by the four flat members, and the adjacent ones of the four flat members intersect to form ridge lines in contact with four wall faces of top, bottom and both side faces of the packaging member, respectively, and

a flat member amongst the four flat members of the cushioning member includes a to-be-engaged part that engages with the wall member to secure the wall member to the flat member and thereby secure the bottom of the cushioning member,

wherein the wall member is configured to stand from the bottom of the cushioning member at one end of the wall member in the standing direction, and the other end of the wall member which is another end of the wall member in the standing direction of the wall member is engaged with the to-be-engaged part, and

wherein one of the wall member and the to-be-engaged part of the flat member is an insert part and the other of the wall member and the to-be-engaged part of the flat member includes a cut portion, and the insert part is inserted into the cut portion to secure the wall member to the flat member and thereby secure the bottom of the cushioning member.

2. The packaging member as claimed in claim **1**, wherein

a space is provided between a most projecting part of the predetermined part of the to-be-packaged member and a wall surface of the packaging member for preventing the most projecting part from coming into contact with the wall surface.

3. The packaging member as claimed in claim **1**, wherein

the ridge lines on which the adjacent ones of the four flat members intersect, respectively, are positioned approximately at the centers of the four wall faces of top, bottom and both side faces of the packaging member, respectively.

4. The packaging member as claimed in claim **1**, wherein the to-be-packaged member comprises:

a receiving container including a container body as the holding part having a containing part that contains contents and a content outlet;

a cap member as the predetermined part that is fitted to the container body to cover the content outlet; and

a sealing member inserted between the container body and the cap member, wherein

the cushioning member is used to hold the container body in such a manner that the cap member and the cushioning member do not come into contact with one another.

5. The packaging member as claimed in claim **1**, wherein the bottom of the cushioning member is configured to contact at least a portion of the bottom wall surface of the packaging member.

6. A packaging method of containing and packaging a to-be-packaged member in the inside of a packaging member via a cushioning member, the packaging method comprising:

providing the cushioning member to hold a holding part of the to-be-packaged member; and

containing the to-be-packaged member in the inside of the packaging member in a state where a predetermined part of the to-be-packaged member different from the holding part of the to-be-packaged member is suspended in the space inside of the packaging member, wherein

the packaging member comprises the cushioning member and a wall member configured to stand in a standing direction from a bottom of the cushioning member,

the cushioning member is a hollow member and includes four flat members collectively hounding a hollow space,

the holding part of the to-be-packaged member is held by the cushioning member in such a manner that a space is provided between the holding part of the to-be-packaged member and a wall of the packaging member,

the cushioning member has a rectangular shape containing the holding part of the to-be-packaged member by the four flat members, and the adjacent ones of the four flat members intersect to form ridge lines in contact with four wall faces of top, bottom and both side faces of the packaging member, respectively, and

a flat member amongst the four flat members of the cushioning member includes a to-be-engaged part that engages with the wall member to secure the wall member to the flat member and thereby secure the bottom of the cushioning member,

wherein the wall member is configured to stand from the bottom of the cushioning member at one end of the wall member in the standing direction, and the other end of the wall member which is another end of the wall member in the standing direction of the wall member is engaged with the to-be-engaged part, and

wherein one of the wall member and the to-be-engaged part of the flat member is an insert part and the other of the wall member and the to-be-engaged art of the flat member is a cut part, and the insert part is inserted in the cut part to secure the wall member to the flat member and thereby secure the bottom of the cushioning member.

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